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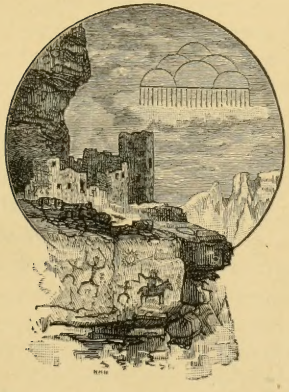
BUREAU OF AMERICAN ETHNOLOGY
BULLETIN 35

ANTIQUITIES OF THE UPPER GILA AND SALT RIVER VALLEYS IN ARIZONA AND NEW MEXICO.

BY
WALTER HOUGH



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ANTIQUITIES OF THE UPPER GILA AND SALT RIVER VALLEYS IN ARIZONA AND NEW MEXICO

By Walter Hough

GEOGRAPHY AND PHYSIOGRAPHY

The area in which are found the archeological remains treated in this bulletin forms part of southwestern New Mexico (western Socorro, Grant, and Luna counties) and southeastern Arizona (Apache, Navajo, Gila, Pinal, Graham, and Cochise counties). It is bounded on the northeast by the great ridge lying between the Gila-Salt and Little Colorado rivers; on the west and northwest by the Tonto basin; on the south by the states of Sonora and Chihuahua, Mexico, and on the southeast by the San Agustin plains. Approximately it extends 170 miles east and west and 200 miles north and south. Much of this area is covered by the Black Mesa, Mount Graham, and Chiricahua forest reserves in Arizona and the Gila River forest reserve in New Mexico. (See map, pl. xi.)

The general region of which this is a large part lies on the southern slope of the great diagonal ridge or break called locally the "Mogollon rim," "Verde breaks," etc., which extends southeast across Arizona and a portion of New Mexico. This remarkable physiographic feature divides Arizona sharply into two regions—the northern, a high plateau drained by the Colorado and Little Colorado rivers, and the southern, a steep slope gradually merging into the level plains along the Mexican boundary, drained by the Gila-Salt river system into the Colorado river, and by the Mimbres, which flows into the inland basin at the foot of the Sierra Madre of Mexico. To the east this ridge takes a northerly direction and is broken into a number of ranges, the Gallo and Datil ranges being the main prolongations that deflect the drainage into the Little Colorado on the north, the Gila on the south, and the Rio Grande on the east.

The Gila-Salt and their affluents rise in the sinuous "rim," which ordinarily presents at its upper portion enormous inaccessible cliffs gashed by innumerable rugged canyons. The high mountains cause precipitation and act as storage reservoirs. Here springs burst forth and trout streams take their rise. Many rivulets trickle from the heights of the great break, coalesce, and descend precipitously between

high ridges and dash through canyons or water the fertile acres of the upper valleys. The streams grow larger and the canyons grow wider in the middle courses of the rivers, till in the lower reaches great valleys open out, in which an ancient population, like that of the lower Gila and Salt, flourished by grace of the moisture condensed on the mountains to the northeast.

Above the 6,000-foot contour the mountains are clothed with a dense growth of pine, constituting part of the greatest virgin forest remaining in the United States. The forest on the higher plateau is open and interspersed with groves of live oak and aspen, forming beautiful parks. Descending from the "rim," one traverses the habitats of plants ranging from the Boreal to the lower Austral zone, so that in following the canyon of Blue river, Arizona, one passes from the pine to the cactus in less than 60 miles, having encountered numerous vegetal forms, each appearing at its limit of elevation.

In accord with the prevalence of vegetal life, there is on this slope abundant and diversified animal life, and here may be found the larger and smaller mammals and birds, and other animals characteristic of the Austral zones, which on their western edges approach the Tropical life zone of the lower Colorado and Salt rivers.

The climate is generally agreeable, depending upon the elevation, growing cooler as one ascends toward the "rim." On the whole, this great area is suitable for human habitation, especially in the upper Austral zone, which, with its ample water and vegetation, would afford support for agricultural and hunting tribes. This is shown by the numerous and widespread areas in the river valleys which man has cultivated and by the evidences of his occupancy of caves, cliff-dwellings, and pueblos, that render this section of the United States of especial archeologic interest.

The geographical features of the region are marked by a number of enclaves, producing isolation and corresponding development of subcultures within the general, comparatively uniform pueblo culture. The movement of population was along the narrow valleys of streams, shut off from contact with other tribes by high mountain masses. That the early tribes were not disturbed is shown by many evidences, notably the absence of defensive works or defensive positions of pueblos and the dearth of implements of war.

HISTORY

The region is also particularly interesting because the earliest European expedition into the southwestern part of the present domain of the United States, led by Marcos of Niza, crossed this uninhabited and inhospitable territory in 1539. In the next year Francisco Vasquez

Coronado, commanding an army of Spanish adventurers, traveled from Culiacan, Mexico, and passed through this wilderness to Cibola (Zuñi). Coronado's route has long been a subject of inquiry, but it is now generally conceded that he passed down the upper course of the San Pedro, thence northeastwardly to the Gila and over the White mountains by the site of the present Fort Apache, Showlow, and St. Johns to Zuñi and the Rio Grande. The region is not believed to have been inhabited at the time of the Coronado expedition, but subsequently it was occupied by bands of Apaches, and the settlement of the country was much retarded in consequence until the establishment of military posts and the final pacification of renegade bands in 1886. Up to the close of the Civil War the settlers were almost exclusively Mexicans, whose principal occupations were mining and farming. The region has never been of great historical importance.

ANCIENT AND RECENT NATIVE INHABITANTS

The tribes formerly inhabiting the upper Gila-Salt River region are probably not referred to in any traditions of the surviving Pueblos, this fact making the problem of their ethnology one of extreme difficulty. Only through the comparison of their arts with those of other regions may even a general statement be made of their likeness or entire dissimilarity to the other ancient inhabitants of the Southwest. It seems likely, from the data at hand, that they were distinct from the tribes of the neighboring regions and sprang from an original local source.

Of interest, because it may indicate a migration of a Rio Grande tribe to the headwaters of the Salt, is the statement in the ancient Zuñi origin myth that the hero Hliakwa, who, coming from Santo Domingo, joined the tribe four years after the War gods had set fire to the world, later separated from the Zuñi and took up his abode in the great mountain southwest of the sacred Salt lake.[a]

It is incredible that none of the blood of the inhabitants of the Gila-Salt region passed into the surviving Pueblos, but there is no proof of this having taken place. It is likely that the Pima-Opata tribes to the extreme southwest and the Zuñi to the northeast have inherited all that remains of this ancient population, while the Hopi to the north still retain traces of the influences of its culture. A comparative study of artifacts must be further pursued to determine the points and the traditions of various tribes recorded with the accuracy which characterizes Doctor Fewkes's work among the Hopi.[b]

[a] Mrs Matilda Coxe Stevenson, *Twenty-third Report of Bureau of American Ethnology*, 60.

[b] Fewkes, Tusayan Migration Traditions, *Nineteenth Report of Bureau of American Ethnology*, pt. 2, 626.

Causes of Depopulation

There was probably not one village surviving in this vast area at the time of Coronado's journey; but the ancient ruins, by their profusion, indicate that a comparatively dense population once lived there. What, then, were the causes which led to the extinction of these people? So far as may be inferred from present conditions, the environment was favorable for the maintenance of Indian tribes, and it is probable, therefore, that there is no geographic or climatic condition adequate to explain the depopulation of the whole region. In some sections disease may have checked the growth of population and finally exterminated the inhabitants, for even in the elevated localities fevers of a certain class bear heavily at times upon the present settlers. In some of the river valleys malaria also at times is prevalent. On the whole, however, the climate is salubrious. Exploration of the ancient ruins, so far as this has been accomplished, invariably shows, moreover, that the abandonment of the pueblos was not due to internal warfare or to attacks by outside enemies.

In reference to the failure of the food supply, due to prolonged drought or other circumstances, there is reason to believe that such failures were less prevalent in former times than in the years since the occupancy by white men. However, starvation may have been a factor in the decline of population in certain localities.

It may be that the most potent cause existed in the social organization of the people, coupled with the isolation enforced by the environment. It is known that the social organization of the existing Pueblo tribes among which marriage is prohibited within the clan tends to self-extinction, and it is possible that the tribes of the Gila suffered from the same cause.

Evidence of the growth and decline of several ancient pueblos on the San Francisco river has been brought to light. In one typical example the village had grown to its limits by the natural accretion of houses forming a polygonal mass, and the cemetery lay outside its walls in the normal position, with the burials placed in the same manner as in numerous other sites. It was found that the external rooms on the ground floor of the pueblo also had been used for burial.[a] Further examination showed that a row of inner rooms had been so used, and that other rooms toward the center of the pueblo were devoted likewise to mortuary purposes. In these central rooms the burials were evidently later, since in many cases no offerings of pottery or other objects were placed with the dead. We have here what

[a] In Halona (a historic Zuñi pueblo) and Los Muertos, in the Salt River valley, the inhabitants continued to live in the houses in which burials had been made, but these interments were under floors, while in the Gila-Salt pueblos the rooms usually contained several graves at different depths, and in some cases were full of skeletons.

seems to be, then, the life history of this pueblo from its culmination to its extinction, the gradually enlarging zone of room burials being an index of the decrease of the inhabitants. The evidence invariably shows that no sudden cataclysm overwhelmed the pueblos, no hasty, disorganized abandonment took place, no wars decimated them, but rather that, like a tree, they passed through successive stages of growth, decline, and decay to final extinction.

CULTURE OF REGION

Distribution

The Gila-Salt region is of such great extent and presents such physiographic diversity that it could well have contained within its limits several peoples distinct in language and arts. Transitory tribes moved across it and local populations inhabited almost inaccessible valleys, cultures mingled on the indefinite boundaries, and there were displacements of one tribe by another; but as a whole, in respect to arts, this section of the Southwest is uniform and characteristic. Bearing in mind the topography, it is found that the ancient settlements were distributed in three zones of elevation, each environment inducing certain modifications of culture. The zones are—

1. Lower, the fluvial plain of the lower Salt and Gila rivers;
2. Middle, the piedmont, crossed by the San Francisco and upper Gila rivers; and
3. Upper, the escarpment, with basins, terraces, and cienagas, and the sources of the Gila, San Francisco, Salt, and Mimbres.

These zones do not follow a definite contour, the course being irregular, like an isotherm, since river valleys carry to greater elevations the fauna and flora of lower zones.

AS AFFECTED BY MINERAL ENVIRONMENT

Geologically the region is composed of igneous formations of great variety, almost entirely hiding the basal rocks. In general, the features shown are cappings of extrusive basalts covering softer rocks, such as tufas, the latter often conglomeritic, and grayish amorphous rocks frequently containing crystals. As a result of erosion, loose masses of basalt are scattered more or less thickly over the country, rendering the roads tortuous and difficult of travel. The valleys along streams are narrow and at intervals show small deposits of alluvium forming the first terrace, generally from 6 to 8 feet thick. Rising abruptly from this is a second terrace having steep slopes banked with masses of flat-ovate, smoothly polished hand stones of quartz, quartzite, porphyry, basalt, etc. This terrace is

usually composed of layers of dense, jointed, almost shaly clay and sand. A third terrace and sometimes a fourth may be seen, as on the San Francisco near the mouth of Blue river. The third terrace rises rapidly against the inclosing wall, its rear portion being filled with angular masses from the rim rock. These terraces were generally the sites of habitations. On the plateaus large areas are covered with soil, and in depressions this soil is often very deep from constant additions in the basins of temporary lakes or in cienagas (marshes). Much of the plateau country would be dotted with lakes were the precipitation greater.

In the basin country, below the edges of the plateaus and mesas and in the beds of streams, springs burst forth, forming the sources and supplies of the water courses. Some of these springs are mineralized, and frequently the water is warm and even hot. Comparatively speaking, there is abundance of water.

This region furnished an adequate and, in some cases, an abundant supply of minerals needful for the primitive arts of the Indians. For house building basalt or other volcanic rock of convenient size was always at hand. Frequently near building sites were found thin slabs of strong creamy-white stone, which was used in construction of flooring, lintels, and fire boxes. Obsidian, chalcedony, quartzite, quartz, and chert were found, together with fine-grained diorite suitable for axes; and that these useful minerals were prized by the aborigines is abundantly shown in both the finished implements and the rejects occurring on the village sites. Chalcedony, which owing to the conditions of its deposition has assumed remarkable forms, is somewhat common and had widespread use. Clays for the potter and for house building were everywhere obtainable, and though not of the quality found in the Jura-Trias and Cretaceous formations of the Little Colorado valley, they were serviceable. In several localities white kaolin is found, and a disintegrated white quartz rock, metamorphosed by heat, was procurable for the paste of gray pottery. Steatite, thin sheets of drip lime, turquoise, and fluorite were sufficiently abundant for the manufacture of beads and other ornaments, of which a profusion is found in the ruins. Pigments consisting of iron-bearing earths, stones for pottery decoration, as well as copper ore, micaceous hematite, ocher, kaolin and charcoal for the painting of weapons, ceremonial paraphernalia, and other purposes, could be had for the searching.

Metal working was not practised, but in course of trade bells of copper were brought from Mexico. One of these, a remarkable pyriform specimen 3 inches long, was taken from a ruin on the Tularosa river. Rich copper was occasionally fashioned, but merely as a stone, and was never smelted or otherwise worked by fire.

Salt was obtainable at several places, but especially and in good quality at the sacred Salt lake southwest of Zuñi, which in former times was visited by the inhabitants of a vast region.

AS AFFECTED BY VEGETAL ENVIRONMENT

Exhaustive collections made in caves and shelters with a view of securing every substance entering into the life of this ancient people strikingly illustrate the preponderant influence of the vegetal world. Few areas in the Southwest are more fully supplied with vegetal material. Coniferous trees in the drier areas and deciduous trees along the water courses furnished timber for building and firewood, while smaller trees and shrubs yielded material for bows, clubs, digging sticks, prayer sticks, and basketry. Bark was put to a number of uses—for bedding, tying, fire preservation, cordage, and costumes. Smaller vegetation likewise had numerous uses—arrow shafts,[a] ceremonial offerings, and flutes were made of reed; mats of tule; baskets, sandals, and mats, of willow, grass, yucca, dasylirion, and other plants. Textile fiber, food, narcotics, medicine, and dyes were derived from wild plants; and cultivated plants, as corn, beans, squashes, and gourds, formed the principal basis of subsistence. Cotton was grown in the warmer localities, and, as in other parts of the Pueblo region, was employed for clothing as well as for sacred purposes.

The débris in dry caves has preserved in a remarkable manner materials which give us knowledge of the vegetal food supply of the former inhabitants. There have been found in these localities corn, beans, squash, and gourds, of the cultivated plants; walnuts, which grow abundantly up to an elevation of 6,000 feet; piñon nuts, and acorns; grass and various other seeds; fruits of the yucca (datil), cactus, gooseberry, grape, squawberry, juniper, and hackberry; and the agave, whose fleshy leaves furnish a sweet nutriment, and numerous roots. In the warmer areas, which are sparser in vegetation, the agave, cactus, acacia, and other desert plants were utilized.

AS AFFECTED BY ANIMAL ENVIRONMENT

The animal environment was important. Larger mammals were represented in the region by the elk, deer, antelope, bear, and mountain lion. Smaller mammals were abundant, and the turkey, grouse, and other birds were numerous. Other orders of animal life also were found here. Among the insects the most useful was the wild honeybee. The skins, pelage and plumage, antlers, claws, hoofs, horns, teeth, bones, sinews, and membranes all had value for various

[a] The arrow reed is now almost extinct in this region.

purposes. The turkey filled so great a need that it was domesticated. Its feathers were employed in clothing and in worship, and for the latter purpose the plumage of many birds was utilized. Through aboriginal commerce shells from the Pacific found their way to this region as to other parts of the Southwest.

The majority of the bones unearthed are those of deer, which then as now existed in great numbers in the hilly country. Nothing has been found upon which to base the opinion that the turkey was eaten. No evidences of cannibalism have been discovered.

The bones found in village débris and in cave-dwellings indicate that animal food was not neglected, even though it did not assume the importance of substances derived from the vegetal kingdom, especially through the cultivation of maize. In common with most tribes, the inhabitants of this area were doubtless omnivorous, the vicissitudes of the environment compelling the people to avail themselves of every resource.

Buildings

Grading of sites

Moisture and vegetation are responsible for the preservation of the ruins found in the mountainous districts, whereas in the open, naked country winds and rainfall are powerful agents in eroding the loose soil and effacing the work of the builders.

The large ruin at the Spur ranch of Mr. Montague Stevens, 7 miles east of Luna, N. Mex., was built on a series of artificial terraces, and the whole site, covering several acres, has been so extensively graded and filled as to cause astonishment. There was far more labor expended in this work than in erecting the pueblo. At the S. U. ranch, on the upper Tularosa, another striking example exists where the high terrace forming the podium of a pyramidal ruin has been shaped and a graded way made to the summit. These are but two of very many instances in which the results of the grading operations carried on by the pueblo builders may still be observed.

Pueblos

The energy of the pueblo builders in the work of constructing edifices of stone and earth has often been remarked by observers. In the open country, as on plateaus and in wide river valleys distant from mountains, the stone village was the common type, and mud was employed in the construction of walls only in absence of more durable material. The influences of environment on the minds of the ancient builders modified their customs, securing the requisite adaptability in their habitations; thus in the colder regions houses were built more compact than in warmer climates; under

rock shelters cliff-dwellings were built; caves were sometimes masked by house rows, while in other instances they formed temporary abodes like the rock shelters.

The pueblos of the hot country at the base of abrupt slopes, as on the Gila and on the lower reaches of its tributaries, were of Bandelier's "dispersive" type, consisting of a collection of houses and plazas outlined with walls, while those of the elevated country, as on the upper San Francisco and Blue, where the temperature is lower, were compact, showing a unified mass of polygonal outline, containing small courts, but having besides, exterior to the village, a more or less ample level space in which burials are found and which perhaps was also designed for public ceremonies.

As an effect of climate also, the houses contain on the average larger rooms than those which are noticed in villages on the plateau north of the Salt river. The rooms in none of these pueblos are so ample, however, as those in the present town of Zuñi or in the Hopi town of Sichomovi. Such ground plans as have been exposed by excavation show that the fire box—a rectangular space lined with slabs of stone—is set in the center of the floor of the room or near one end, not in a corner. Openings between communicating apartments are very small and low. Banquettes are often constructed around the sides of the rooms; floors are sometimes laid with flat stones and the walls neatly plastered with mud.

The smaller pueblos are generally divided into rooms of equal size, while, as an outcome of the differentiation of interests among greater bodies of men in larger pueblos, some rooms are quite large and others are small or of medium size. Most of the rooms of a pueblo were for sleeping and storage purposes, but usually the large chambers were living rooms, which at times were used for meetings of fraternities, or perhaps set aside altogether for such meetings. A number of rooms were employed for milling and baking.

In masonry or other details of construction the stone pueblos offer nothing striking or different from the customary style. Some rooms are laid up with thin slabs of white stone, obviously an evidence of taste in the builder, and these rooms also were not plastered. In one instance on the Tularosa the edges of many of the slabs were decorated with grooves and incised lines forming ornamental patterns. Examples of decorative treatment of walls by alternating contrasting bands of stonework similar to the construction of pueblos in Mancos canyon are found here.

The pueblos of earth construction, which in this region are confined to the Gila and the lower courses of some of its tributaries, show at present, in their extremely degraded state, walls of rammed earth provided with cores of smooth river bowlders. These walls held at

intervals posts rising above them into the superstructure. Most of the ruins show their extent and plans by the lines of these bowlders protruding from the soil. There is sufficient basis, however, for the belief that the bowlder-earth wall belonged to a lower story and that above it were a structure of earth and sticks of lighter character and a flat roof resting upon the posts. So far as known, no adobe brick or block construction, like that used in Mexico, was practised in any part of this region. Wherever villages of this type occur (on lower Gila and Salt and southward through Mexico), the ruins show a high mound surrounded with lower masses of débris. These have been designated temples by Cushing, and have generally been regarded as council houses, sacerdotal or defensive structures, a surviving type of which is Casa Grande, near Florence, Ariz. Irrigation works are always associated with ruins of this kind, and on the rivers mentioned these works are the most important found in America.[a]

CLIFF-DWELLINGS

While structures of this class were not so numerous or large as those of the San Juan watershed, yet their distribution was extensive throughout the mountain region, where they exist whenever the physiographic conditions are favorable. They have been found in the canyons of the San Francisco, Tularosa, Blue, Eagle, Pueblo, Salt and Gila, and Gila Bonita, and they reach westward to the Tonto basin. Generally they occupy sites in narrow canyons near the headwaters of rivers and consist of a row of small one or two story houses placed under an overhanging cliff or in front of a cave. Single houses were often placed in niches or fissures in the rocks. Scarcely any pocket large enough to shelter a human being but shows evidence of occupation, mostly temporary perhaps, though frequently such places are blackened with smoke and contain much refuse.

The cliff-houses are in construction like those of the San Juan region, and they preserve the details of building that have disappeared from the open-air pueblos. A comparison of artifacts found in the pueblos and cliff-dwellings shows their similarity, and indicates clearly that the two classes of structures are work of the same people.

A niche adjoining a cliff-house on the San Francisco river near the mouth of the Blue was devoted to milling, as shown by the well-worn cavities in the floor (see p. 47). On Pueblo creek and at the head of the Tularosa similar milling rooms were excavated in the soft rock.

[a] Hodge, Prehistoric Irrigation in Arizona, *American Anthropologist*, VI, July, 1893.

OTHER CONSTRUCTIONS

Quadrangular boxes, made of stone slabs set on edge, are common in the ruins of northern New Mexico and Arizona and are more rarely found in the sites south of the mountains. Consisting of bare slabs of stone, and only in very rare instances containing any objects or substances explaining their function, they have been the subject of many conjectures. By comparison they are probably pahoki (prayer-stick houses) such as those in which the Hopi place offerings, and are thus shrines in the strictest sense.

Occasionally fireplaces are found near the villages, and in several of the Spur Ranch ruins these were of burnt clay, with bosses for pot rests. Sometimes, also, metates were set up in the open air near the village.

Associated with all the ruins are circular depressions, which in common parlance are called "reservoirs." These are detached, contiguous to the village, or incorporated in the house mass. While some of these which lie outside the villages may have been intended to impound rain water falling during heavy storms, and while depressions in village sites along the course of the Gila may have formed part of the irrigation system, it appears that very rarely was the storage of water their function, and in many cases the purpose of the isolated, simple, bowl-like depressions is unknown. They may have been quarries whence was taken the clay or mud for mortar, plastering, and other requirements, for which this material was in constant demand.

Many of these depressions were undoubtedly kivas, such as those either built in the pueblos or situated in the plazas or near the walls of the village. These are deep and have vertical sides walled with stone.

A large series of ruins lying on the plateau extending northeasterly from Luna to the headwaters of Apache creek show circular depressions intimately connected with their plan (see p. 62). Even when they contain only a few houses they have immediately adjoining them a shallow basin (generally about equal in area to the houses), and usually at one side of the basin are one or two rooms. A typical plan is seen in figure 33, page 66. It is possible that these bowl-like depressions were sites of arbors where communal work could be carried on out of doors, lounging places, or at times open-air kivas like the circular fence of stakes of the Navaho. In larger ruins of this group one may see these circles inclosed by buildings of two or more stores, thus appearing as octagonal or polygonal wells and provided each with an entrance. These are kivas which have been closed in by the gradual extension of the pueblo.

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On the upper Blue river are found large rectangular kivas sunk in a graded terrace or in level ground. The sides are walled up and the entrance is by a paved incline on the east side. Flanking the entrance are single rooms (see plan, p. 54), which appear to be keepers' lodges. These kivas are detached and appear to have been common ceremonial chambers for a group of pueblos. A ruin near Linden, Ariz., has a circular kiva of this type, while the immense ruin at Forestdale, south of Linden, has a deeply sunken kiva 25 feet square.[a]

At Eastcamp (see p. 77) detached kiva sites consist of an L with the circular kiva chamber in the angle. This form is also found at the Spur ranch (p. 67).

In some of the ruins on the Blue river there are situated in the plazas constructions resembling wells. They are 3 feet in diameter and 8 or more feet deep, lined with laid-up stone. Their purpose is not known.

A discovery made by the writer in the country surrounding Luna, N. Mex., bears on the subject of the circular concavities associated with ruins. Two sites were examined, of which the sole remains were large shallow pits containing much of the house débris with which the location was covered. In excavating the plaza of a rectangular stone-built pueblo near the Spur ranch these deep circular constructions were encountered. They have a diameter of about 15 feet, vertical sides, a square fire box in the center of the floor, and around the sides and across one diameter are traces of wooden posts. The débris contained many bones of animals, flint chips, roofing clay, and other refuse. At one side a flexed burial unaccompanied with mortuary objects was unearthed. The site was evidently occupied at one time by circular semisubterranean houses; subsequently, rectangular stone houses, like those of the site previously mentioned, were erected on the border of a shallow excavated basin 50 feet in diameter, forming a pueblo of the type common in this section. Another pit ruin of great extent was observed in the environs of Luna. The surface of the site is smooth, giving no indication of the dwellings beneath. A burial was uncovered here during the cutting of a ditch, and subsequent examination by the writer determined the presence of pit-dwellings. The surface soil of the site contains innumerable small fragments of coarse brown undecorated pottery; rarely fragments of a peculiar creamy white ware with red-brown linear decoration and almost no chips or masses of stone.

In various locations are comparatively recent traces of Apache Indian lodge sites. These consist of rings of stones inclosing shallow depressions.

[a] *Report of United States National Museum*, p. 290 and pl. III, 1901.

Shrines

There are four classes of shrines of which remains exist in this region. These are caves, springs, rock piles, and stone rings. The caves are receptacles for various offerings thrown in without order or placed in small square areas outlined with low stone walls or ridges of gravel, which the first observers thought the remains of houses. (See p. 52.) The caves were usually quite difficult of access.

Important springs have received various offerings, as stone beads and miniature pottery. Occasionally during operations for enlarging and cleaning springs many of these objects have been recovered. At Gallo springs, in western Socorro county, N. Mex., hundreds of small facsimiles of pottery vessels were encountered in the marshy border and basin of the spring. In a spring in northwestern Socorro county a carved and painted wooden figure of a serpent was found. This specimen is now in the National Museum.

Few of the springs in this region have been walled up like those of northeast Arizona, the only example noted being the splendid spring at the Olney ranch, some distance from Solomonsville on the slope of Mount Graham, which appears to be inclosed and provided with steps.

The sands of thermal springs especially contain numbers of beads of black, white, gray, red, and blue stone. It has been customary for young people in the neighborhood to visit the hot spring in the canyon of the San Francisco, below Spur ranch, in order to glean beads from the volcanic sand washed out by the water. Quantities of beads have been secured and it is probable that in the spongy vegetable mass bulging on the slope below this spring offerings of pottery could be found.

Shrines contiguous to villages consist of circular piles of small stones and twigs, like the Masauû shrines of the Hopi,[a] and rings of bowlders containing concretions, weatherworn stones, and crystals. Greater numbers of such shrines are found in the Spur Ranch valley than elsewhere, though this may be accounted for by the small erosion there.

Stone-ring shrines are not immediately connected with pueblo ruins, but occupy the summits of mesas and mountains. In the Tularosa-Apache region examples are found on the Delgar mesa, Apache mountain, and Queens head. The stones used in forming the rings are very large, and the offerings were of pottery, of which great quantities of shards still remain in the rings. On Mount Thomas, Arizona, are other shrines of this description and it is reported that the Zuñi and other Pueblos still make offerings on this peak.

[a] Fewkes, *American Anthropologist*, n. s., VIII, 353, 1906.

Domestic Life

DRESS AND ADORNMENT

Much that is interesting in respect to clothing may be learned from perishable remains preserved in caves, and from the more durable organic substances derived from the cemeteries and the houses of the pueblos. It is possible with their aid to reconstruct in large measure the costume and personal adornment of the ancient population of this region, especially of those living on the south-flowing streams descending from the great escarpment. The major west-flowing streams, which run through warm valleys at the base of the mountains, do not so often present the juxtaposition of pueblo and cave or cliff-house, and for this reason the story is not so complete in this portion of the environment.

Throughout this region, however, some adjuncts of costume, such as necklaces of stone or shell beads, armlets, wristlets and finger rings of shell, anklets of shell, and pendants of stone, occur in all localities. These are supplemented from the mountain caves by ornaments of feathers and fur, portions of insects, dyed cords, and other objects, showing the extent of this early manifestation of the esthetic in personal decoration.

No evidence appears that head covering of any description was worn, nor, unless certain small perforated stone tablets were for ear pendants, was any ear decoration practised. In the lower country, as on the Blue at Bear creek (p. 51) the costume consisted of front and back fringed skirts of cords, like those worn some years ago by the Mohave, Cocopa, and other southern Arizona tribes. Small facsimiles of this garment were deposited as offerings in the Bear Creek ceremonial cavern. Here also small cotton blankets were worn around the shoulders, and larger blankets of the same material, fragments of which are found, probably served to wrap the whole body. Sandals of yucca fiber, consisting of a simple braided rectangle for the sole of the foot, answered as a protection from the sharp volcanic rocks. The costume of the Indians in this zone showed that the need for protection against cold was not great, and few traces of garments made up of cords wound with feathers or fur are found in the caves, while they occur plentifully in the northern and more elevated districts.

In contrast with the costume worn by the inhabitants of the lower Blue river that of the upper Tularosa shows markedly the effect of extreme cold. Pelts of animals were used here, the larger mammal skins being employed entire and the smaller cut in strips and wound around cords which are combined to form a texture. The downy feathers of the turkey were deftly wound about cords which were then made into blankets and garments or employed as parts of costumes or as ornaments.

The dress of the upper Tularosa people consisted of a jacket made of feathered cord secured by a woven band, a loin band made up of numerous cords forming a bundle with ends hanging down front and back, and sandals. Skirts like those found on the Blue river were also worn, probably by women. Large robes of fur cord formed a wrapping for the whole body.

Sandals in great variety occur here and in the cavern back of the row of houses there was a veritable museum of cast-off footwear and other personal rejects. There are two general classes, viz, the sole sandal for summer wear, made of yucca strips or woven from fiber, and large shoes of basket work stuffed with shredded grass and wound at the ankle with feather cord. With the sandals also occurred squares of coarse woven bast cloth—used, it is believed, to wrap the feet like the duffel socks worn in the Hudson Bay territory. This may be regarded as the costume of the mountain Indians, one which clearly gives evidence of the reaction of the environment upon human arts.

Connected also with costume in this locality are pouches of skin—sometimes tanned and sometimes of the natural pelt—which were carried about the person; of these a number were found, as well as small pliable baskets of similar use. In several instances hair brushes of grass stems, like those used by the existing Pueblos, were found.

HOUSEHOLD FURNISHINGS

Some insight into the domestic life of the Gila tribes may also be gained through the remains from both pueblos and cliff-houses. From the former are secured objects of durable materials connected with the preparation, cooking, and serving of food—small mortars and pestles; metates and manos; vessels for mixing, cooking, and holding food, for containing salt and small portions of the meal, and for transporting, storing, and distributing water. From the latter come torches of reed, splints, and bark; baskets for various purposes; gourd vessels; matting of yucca and tule; carrying nets of yucca leaves; hooks; sticks for parching corn, and for various other household purposes; hafted stone knives; and platters of bark. The inhabitants possessed bed heaps, rudely constructed, though in a definite manner, of softened grass inclosed in a mat-like net of yucca leaves. Bundles of grass leaves served as pillows. The baby was placed on a skin laid over an ovate mat of tule bound on the edges.

Bundles of corn blades neatly folded over and tied and new corn ears strung on cord hung about the cliff-houses in secure places, while beans and maize ears were put into jars or mat baskets out of the reach

of rodents. Herbs, roots, and fruits were dried and stored. A picture similar in most respects might be drawn in the households of the living Pueblo Indians.

INDUSTRIES

STONEWORK

The Gila peoples pecked, chipped, ground, and drilled stone, using these practically universal processes with a fair degree of skill; but the products are very unequal, some specimens being of the rudest type and some of high excellence in design and finish. The stone art of the present Pueblos has these characteristics.

The process of pecking is seen extensively on metates, manos and other hand stones, axes, hammers, and rubbing stones. Apparently this work was carried on in certain rooms of the pueblos, where numerous examples have been found in every stage of completion. Great care was frequently given to the finish of a metate, especially to those set up on a foundation and rimmed with an oval frame of hardened clay, and the lines of these specimens are nearly perfect (see pl. III). Even an ordinary hand stone sometimes displays a perfection of shape and finish that gives an excellent impression. In the Pueblo Viejo valley slabs of a greenish fine-grained, not very hard stone were worked into polishing stones, tablets, and sculptured objects.

Chipping was employed in fashioning arrowheads, knives, and drills and in edging thin plates of hard volcanic rock used as saws for working wood. Arrowheads, principally of translucent obsidian, show the finest workmanship (see p. 41), and drills exhibiting marvelous skill in chipping are found. From the large ruin at the Spur ranch there was secured a disk of chalcedony, chipped and battered into form and polished on one face, probably for use as a mirror or reflector. The forms of chipped instruments follow conventional patterns and were scarcely influenced by the motives which induced tribes of other localities to produce eccentric shapes or tours de force, as animal and other forms suggested by nature.

Frequently stone implements which were pecked into shape had the cutting part ground (as the edge of an ax) and the body left in a rough state. Often the groove of an ax was unground, apparently to secure a stronger grip of the hafting. In the vicinity of dwellings there remain on rocks scores and depressions made during the grinding process. A fine example may be seen near the cave at the head of the Tularosa river, where a large block of hard rock bears a row of such concavities scooped out by the finishers of implements.

Soft rocks of the class of tufa admitted working by means of flint points or scrapers. Small mortars and large tubular pipes,

"cloud blowers," of this material bear evidence of the gouging, cutting, and scraping used in excavating them, while their outer surfaces have been finished by grinding. These and other cult objects were painted with red, yellow, white, black, and green pigments.

Drilling was usually practised in making beads, pendants, and other objects, of which innumerable examples occur. Some are so small that it is a problem how they were pierced. The drills, sometimes of obsidian but usually of chert, are long and slender and of superb chipping.

SHELLWORK

Olivella shells were prepared for beads by grinding away the apex and base; conus shells were likewise worked; and the Pacific clam was drilled for necklace pendants, sawed into bracelets and finger rings, or carved into likeness of the frog. The massive portions of shells were formed into beads, usually circular, but sometimes drop-shape. Thin plates of shell were cut into ornaments representing animals. The processes by which shell was worked were grinding, drilling, and sawing. Shell objects were sometimes engraved, the surface lending itself particularly to this work, which was often artistically done.

BONEWORK

Though more resistant than shell, bone was readily worked by means of stone saws, grinders, and drills. As a rule most bone implements are manufactured from portions of the skeleton selected on account of their shape and worked only so much as required. The majority of awls answer to this description, but splints from long bones were also ground into shape. When it was desired to section a bone, it was grooved with a stone saw and broken apart, and the rough end ground smooth by rubbing. In a few instances bone was used to form ornaments and gambling dice. Occasionally bones were ornamented with scores and colored with pigments.

WOODWORK

House timbers, wherever they survive, frequently show the marks of the stone ax with which they were shaped. Firewood, procured almost entirely from such brittle wood as junipers and cedars, was broken off with stone hammers and axes or by hand. Stems of tough shrubs suitable for bows, arrows, digging sticks and other implements were scored with stone saws and broken or twisted off, or cut with flint knives, the work with this tool having the appearance of scraping rather than cutting.

The foreshafts of reed arrows worked from hard wood, made with a tang and shoulder and fitted in the end of the pile, display neatness and skill in joinery. Bows are generally rude, though examples are accurately shaped and finished. More skill was displayed in the preparation of ceremonial paraphernalia, and among the objects may be found rods worked with roundels, like lathe turning, and flat strips of wood tied together with cord edge to edge, like modern Pueblo ceremonial headdresses.

TEXTILES

Every plant in the region that yields fiber was utilized, and in consequence the variety of cords found in the caves and cliff-dwellings is remarkable. The stronger and more durable of these were made from the fiber of various species of the yucca, dasylirion, agave, and other plants of this order, the leaves of which also furnished extremely useful sinewy strips for tying. The fiber was extracted by scraping and chewing, the latter process giving rise to the "quids" which are of common occurrence in cave refuse. Shredded bark of the willow and alder was twisted into soft cord, and on the upper Tularosa woven into coarse cloth, and cords of human and animal hair, though less common than other kinds, were also made. In some localities cotton cords and thread were abundant and in others of limited occurrence.

A remarkable range of technic in cord was known here. Two, three, and four ply; loose twisted, hard twisted; flat, round, and square braid, and served cord, are among the varieties. Both untwisted strands of cotton and cotton twisted to the fineness of small thread are found. A noteworthy range of colors produced by dyeing occur, and the ties and knots are various enough to form a separate study. Many of the fabrics produced show advanced ornamentation.

Woven cloth of various materials and fineness was produced, cotton being the most common textile. On Blue river and the head streams of the Gila cotton garments were ornamented with drawn work. As to the apparatus and tools used in weaving the most earnest search yields no clew.

BASKETRY

The following varieties of technic were here practised, viz, twining and tying in feather cord robes and jackets, tule and yucca mats or skirts; wicker, in basketry and sandals; checker, twilled, and diaper in mats, sandals, and baskets; plain and ornamental weaving

in sandals; wrapped like Mohave work, and coiled weaving of several varieties, notably the "lazy stitch," which heretofore has been found in use only in southern California.[a]

From the variety of materials to be had in the region the Indians selected twigs and splints of rhus and willow; strips of yucca, dasylirion, and like plants and fiber of the same; stems of grasses and rushes; bark of the grapevine; splints of reed and other natural vegetal products not yet identified. These data were gathered from two sites—on the Blue at Bear creek and on the Tularosa near its head. The series from these sites is remarkable for diversity, and nowhere is found a like conjunction of so many methods of weaving.

The basketry vessels rarely show the highest technical and esthetic qualities; woven designs are scarce, and instead the exterior decoration was applied by washes in red, green, black, and white, relieved on the natural color background (Blue river). Bowls; trays; mats; oblong cases with lid, like Pima specimens; overlaid staffs; fan-shape portions of ceremonial offerings, and of other objects are among the forms of basketry discovered in this area.

POTTERY

No remains of human art and industries are more important to the student of ethnology than pottery, since upon such remains (which invariably bear the impress of tribal individuality and environment) the origin, range, and state of culture of groups of men are indicated.

Like the basketry, the pottery of the Gila region presents within a single site great diversity in form, texture, color, and ornamentation. Despite this variety, however, there is an unmistakable concrete likeness which indicates the unity of this great area in culture, but it is not to be understood that there were no contributions to the pottery of this region acquired by whatever process from other regions. There are here, in fact, several types of ware common to other portions of the Southwest, over and above the types whose location is south of the great plateau, and which extend below the international boundary into Mexico. There are found here the following kinds of pottery technic: Coiled, corrugated, mammillated, and scored exterior; smooth, with filleted rim, and with geometric tracery of white on the exterior (open vessels of the foregoing classes have black, highly polished interior); gray (black and white), and

[a] Mason, Aboriginal American Basketry, *Report of United States National Museum*, 1902, Washington, 1904.

red ware, the latter decorated with black and the exterior of the rims having geometric ornamentation in white. Cream-color ware with red-brown decoration forms another characteristic class of the pottery here considered, which is represented by only a few specimens from sites in the elevated zone.

Though coiling as a method of constructing pottery was generally practised in the Pueblo region, its use as decoration growing out of structure is of greater interest and importance in this area, where, besides the common varieties of pinched coil by which vessels of crude materials are made attractive, vessels were covered with fine corrugation, on which textile designs were made by pressing down the ridges by means of a tool. These specimens are, as a rule, finely executed and have a pleasing appearance.

The chief kind of pottery made in this region was the smoothly finished brown or red-brown type in coarse paste, undecorated save by a fillet or rim border and occasionally a key pattern traced in white. This ware was designed principally for ordinary use, though the large red-brown bowls with white line decoration and lustrous black interior are highly ornamental, and show the best development of esthetic taste in this class.

The characteristic ware found on the Gila in the lower and warmer zone has a coarse, friable brown paste, washed with a cream color, forming a ground for black and red decoration. The ware, though somewhat lacking in grace and form, is brilliant and effective, and technically stands almost alone. It is one of the few examples of polychrome ware.[a]

The gray ware is rarely of the hard white paste seen in some localities, but it was constructed of coarse dark body material and washed with kaolin to form a ground on which the decoration was drawn. In this respect the ware is identical with the gray from most localities. The red ware was similarly produced by washing ocher over a neutral body, burnishing, and firing, and most of the specimens are of good quality.

A general view of the pictorial, plastic, and decorative arts of the people of the Gila gives the impression that they have no culture specially higher or in many respects different from that obtaining in the Pueblo region. There are, however, developments in sculptural forms beyond that in other areas, which point to southern influences. This is seen in pottery figurines, a notable example of which from a cave in the Nantack mountains was described by Dr. J. Walter Fewkes.[b] The forms of pottery are generally less grace-

[a] *Twenty-second Report of Bureau of American Ethnology*, pl. LXVIII.
[b] Ibid., pt. 1, 189.

ful than those of the region to the north (Tusayan), but from favored localities, as the fertile and beautiful Tularosa valley, there came numerous examples of gray ware without rivals.

No less skill and taste characterize the application of decorative designs, which in this region are almost exclusively geometric. They appear to be repetitions of a limited number of symbols, the common motives being rain clouds and birds, and maze patterns painted on pottery for esthetic effect. On the upper Salt river, however, occur symbolic unit designs drawn on the concave of bowls, connecting thus with the culture of the Little Colorado valley.

AMUSEMENTS—LANGUAGE—RELIGION

Little may be said concerning the intellectual pursuits of these tribes. That they enjoyed games and pastimes is evident from the objects found in the caves where reed and bone dice have been discovered. The former were short sections of halved reed, etched or scraped and blackened, and the latter ovate or circular bones similarly engraved to indicate values in gaming.

Music was also a pastime of these ancients, who used flutes of reed and yucca stalks. There is evidence of a comparative nature that the former inhabitants of these pueblos, now ruins, were familiar with many ceremonial songs, which they accompanied with rattles or with rhythmic sounds made with drums or other instruments.

As to the speech of the ancient dwellers in this region and its affiliations, if such exist among living tribes, necessarily nothing can be said. In common with other Indians, picture writing was the nearest approach to recorded speech, and numerous examples pecked in smooth rock surfaces are found in various localities. The most extensive of these petroglyphs may be seen near the forest ranger's station on the lower Tularosa, on the Blue river near the Henry Jones ranch, and near Fort Bayard. These petroglyphs may have a serious meaning or they may be merely chance scribblings of passing visitors. In the former case they may be regarded as totemic characters designating clans or individuals who have halted in the neighborhood in their migrations; in the latter case, meaningless pictures made with no other intention than to pass away time.

They consist of human and animal and cult figures, as tracks of bears and turkeys, mingled with nature symbols, as of the sun, water, and stars; often there are maze frets and geometric symbols like those on pottery. Accompanying these are rudely drawn realistic scenes of hunting. While these are not consecutive or definite records

and only here and there can the symbols be read, they are valuable for comparison and in a limited way show tribal characteristics of art.

That little is known of the ancient religion may be shown by the character of the offerings in the shrines to which reference has already been made. Cult apparatus is in the highest degree interesting and instructive, and by the very fact of its deposit preserves much concerning the culture of the worshipers that would otherwise be lost. Here were deposited offerings in great variety derived from the mineral, vegetal, and animal kingdoms, and fashioned and decorated by human art.

So far as may be ascertained at this time, the deposits in shrines were concretions of strange shapes, crystals, and spheres; in springs, beads and miniature pottery; and in caves, objects in great variety. It may be possible through comparison with cult objects of existing pueblos to interpret this paraphernalia, and as in the religious phenomena of the Pueblos of to-day, this apparatus will be found to represent another manifestation of the force of environment in determining the religious beliefs and practices.

DISTRIBUTION OF THE RUINS

I.—The Gila from San Carlos to the Head

The ancient remains found along the Gila river from its head, northeast of Silver City, to below its junction with the Salt are practically uniform, and the explorations which have been carried on near Phoenix, above the mouth of Salt river, by F. H. Cushing, and on the Gila, at Solomonsville, by Dr. J. Walter Fewkes and the writer, prove conclusively that the inhabitants of this westward flowing river were alike in arts.

The Gila, the Little Colorado, the San Juan, and the Rio Grande are examples of rivers along whose main valleys the movement and settlement of peoples were but little restricted, a condition tending to produce similarity of culture activities. On the upper waters of the rivers, however, or on the affluents, there is more likely to have been mingling of peoples of different regions or the valley of a contributing stream may have contained only the remains of a single tribe.

The constructions on the lower Gila were built of adobe, and a typical surviving building of this class is Casa Grande, near Florence, Ariz. Those on the upper Gila, at Solomonsville, in the valley called Pueblo Viejo, 90 miles east of Florence, are of similar structure; they are situated on the level agricultural bottom near Solomonsville. Pueblo architecture is largely influenced, however, by the material and climatic environment. Thus the absence of stone, which is naturally

the material for construction that suggests itself to the Indian, leads to the use of adobe as a practical necessity.

Near the hot springs of the Gila are well-preserved cliff-dwellings which are of considerable interest. The cliff-houses on Diamond creek, discovered by Mr. H. W. Henshaw in 1877, are among the first ruins of this character described in the Southwest. The upper reaches of the Gila lie close to the head of the Mimbres, on which river some of the peoples were evidently related to those who built the great pueblos at Casas Grandes, as was shown by Bandelier in the account of his reconnoissance of 1883–4.[a]

There has been no systematic effort to locate the ruins on the upper Gila and the country southward to the Mexican border. While it is probable that no large or important ruins are situated at any considerable distance from the river, the region is interesting, through the relations of its tribes to the former sedentary tribes of northern Mexico.

One of the most remarkable constructions in the Southwest is a prehistoric dam in Animas valley, southern Grant county, N. Mex. It consists of a gigantic earthwork 5½ miles long and 22 to 24 feet high, involving in its building the handling of from 8,000,000 to 10,000,000 cubic yards of material. The purpose of this earthwork, which is undoubtedly of artificial character, was to impound water for irrigation, and the work is comparable to that found in the irrigation systems of the ancient inhabitants of the Gila and Salado valleys, Arizona. The dam was discovered by the engineers on the survey of the international boundary line, United States and Mexico, and has been described, profiles and sections, by Capt. D. D. Gaillard, U. S. Army.[b]

1. SOURCES OF THE GILA

No. 1. Cliff-dwelling.[c]—In the rim of a mesa 4 miles north of Datil, Socorro county, N. Mex., there are 5 or 6 contiguous rooms forming a cliff-house, but only one of them is intact. The pottery from this locality is dull gray and brown in color and of crude manufacture, resembling that from near Magdalena, N. Mex., and stations on the Rio Grande. The size, location, and plan of this ruin relate it to many similar ruins in the mountains of southern New Mexico and Arizona. Few ruins exist in the neighborhood of Datil or apparently are to be found on the streams of this portion of the Datil range, which borders the dreary San Agustin plains.

Professor De Lashmutt, of Tucson, reports a quarry of obsidian located on the headwaters of the Gila near the San Agustin plains.

[a] Final Report, pt. II, *Papers of Archæological Institute of America*, Am. Series, IV.
[b] *American Anthropologist*, IX, 311–313, September, 1896.
[c] The location of each ruin is shown on map, plate XI.

This quarry was worked by the aborigines. In the neighborhood of the quarry is a walled inclosure of great extent, containing near one side a "reservoir."

No. 2. Pueblos, caves, and cliff-dwellings.—At Gatton's ranch, on Sapillo creek, a branch of the Gila, Bandelier (Final Report, II, 359) saw a quantity of pottery and other artifacts which were taken from a cache some time before his visit. The specimens were stated to be like those from the Mimbres valley, which lies a few miles to the east. The ruins along the Sapillo are small and in no respect different from those on the headwaters of the Mimbres.

Bandelier also mentions the occurrence of caves at Mangas springs[a] (6 miles southeast of Gila, T. 16 W., R. 17 S.), from which ceremonial objects have been taken.

No. 3. Cliff-house and cave.—On Diamond river, about 8 miles above the mouth and 16 miles southwest of Old Camp Vincent (on T. 14 W., R. 10 S.), are ruins located in the walls of a canyon about 30 feet above the valley. The front wall is from 15 to 18 feet long, is built of volcanic débris laid in mud, and has timbers cemented into the inner face. There are two rooms, one of the latter about 14 feet long by 10 feet wide. The smaller room has two loopholes and the larger a door and window. To the right, 20 feet above, is an open cavern, access to which can be had by rude steps.

This cave contained broken bows and arrows heaped in a pile near the front, and Mr. Henshaw estimated that there were more than 1,000 broken shafts at this spot.[b]

Bandelier describes a large cliff-dwelling located near no. 3, and gives plans and sections.

> These cave dwellings are properly but one story high, but the compulsory adaptation to the configuration of the ground has caused an accidental approach to two stories. They are instructive for the study of the development of the terraced house of the Pueblo Indian. Perfectly sheltered, and therefore quite well preserved, the cave villages are perhaps larger than the open-air ruins, compactness compensating for the limitation in space. But they illustrate the fact that the foundations remaining of villages built in the open air are frequently only those of courts or inclosures, the mounds alone indicating the site of buildings. Of the twenty-six compartments contained in the caves on Diamond creek only, nine were clearly elevated structures, as the doorways show; the rest are in many cases courts of small dimensions, encompassed by low and still perfect inclosures. The roofs are of the pueblo pattern, well defined, but in one cave the trouble of building them was spared by completely walling up the entrance, with two apertures for admission. The fireplace was a rectangular hearth, as I found it at Pecos, and placed in the center of the room.
>
> The partition walls are of stone and laid up in adobe mud. Some of them still preserve their outer coating of yellowish clay. Their thickness is 0.30

[a] Named for Mangas Coloradas, "Red Sleeves," the famous Apache.

[b] Wheeler Report, *Archæology*, VII, 370–371, Washington, 1879.

meter, and the roofs were entire on some of the rooms. Round beams with the bark peeled off were in a good state of preservation. The diameter of these beams varied between 0.07 and 0.24 meter (3 to 9½ inches). The roof which these beams supported was of the ordinary pueblo pattern and 0.23 meter (9 inches) thick. The doorways were nearly square, and low. Air holes, T-shaped and of unusual size (0.95 by 1 meter), opened upon the outside in several places.

These buildings occupy four caverns, the second of which toward the east is 10 meters high. The western cave communicates with the others only from the outside, while the three eastern ones are separated by huge pillars, behind which are natural passages from one cave to the other. The height of the floor

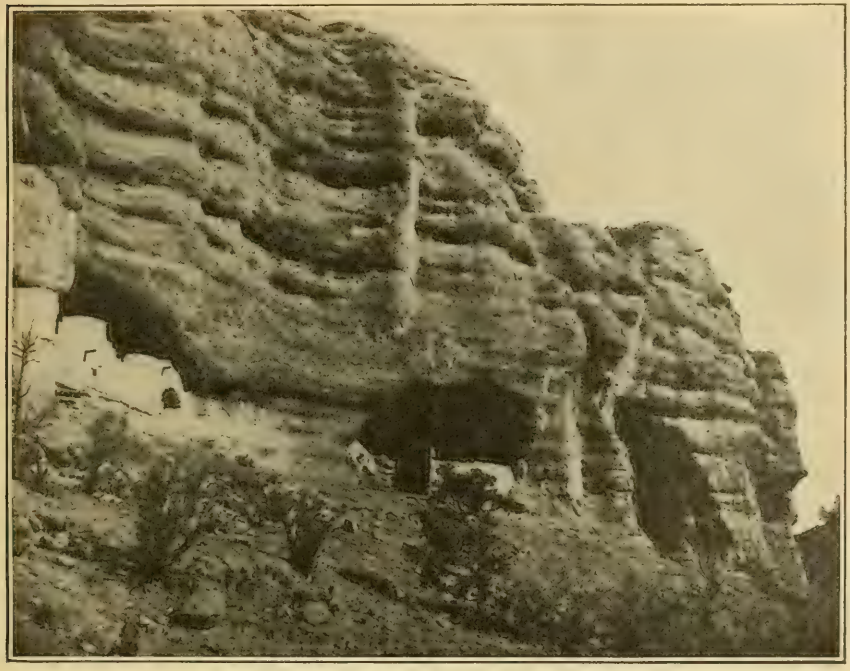

FIG. 1. Cliff-dwellings, West fork of the Gila.

above the bed of the creek is 55 meters, and the ascent is steep, in some places barely possible. To one coming from the mouth of the cleft the caves become visible only after he has passed them, so that they are well concealed. But while it would be difficult for an Indian foe to take the place by storm, its inhabitants could easily be cut off from water or starved. The southern slope, fronting the caves, is steep, but covered with forests, and the cleft is so narrow that a handful of men, armed with bows and arrows and posted behind the tall pines, could effectively blockade the cave dwellings. With all its natural advantages, therefore, this cave village was still extremely vulnerable.

Among the many objects taken from these ruins I mention particularly sandals made of strips of the yucca. It may be remembered that similar footgear was found at the Tze'-yi (Chelly). I have been informed that the Tarahumares of southwestern Chihuahua still wear the same kind of sandals. In

addition, I saw many baskets or fragments of baskets; also prayer-plumes and plume-sticks. Such remains indicate that their makers were in no manner different from the Pueblo Indians in general culture.[a]

No. 4. Cliff-dwellings.—These ruins are on the headwaters of the Gila river, near Hot springs; they are accessible from Silver City.

2. PUEBLO VIEJO VALLEY

Lying south of the eastern portion of the White Mountain reservation in Arizona, in townships 24 to 28 east and 6 and 7 south, is the broad and fertile Pueblo Viejo valley, through which flows the Gila.

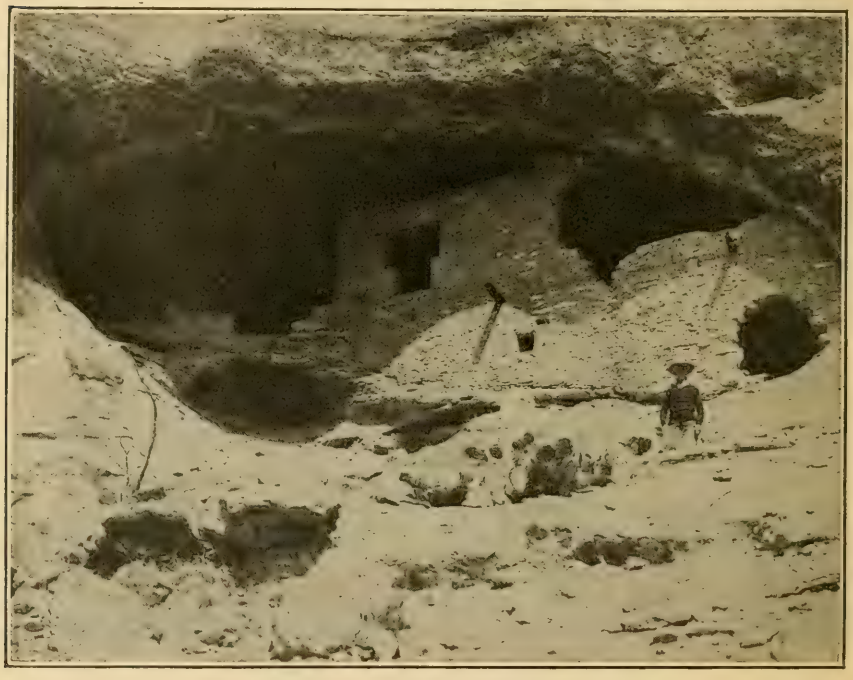

FIG. 2. Cliff-dwelling, West fork of the Gila.

The ruins of the valley, which are mainly situated on the level alluvial lands of the river, consist, as a rule, of a central edifice, surrounded by smaller structures. They are built usually of mud, the lower walls having a core of water-worn bowlders with upright wooden stakes at intervals, showing that a lighter structure supporting the roof was continued above the basal story. As in many other sections of the Southwest, the ruins are frequently oriented to the northeast. Owing to the fact that this valley was early settled by white men, the ruins have become almost obliterated, incident to the grading of

[a] Bandelier, Final Report, pt. II, *Papers of Archæological Institute of America*, Am. series, IV, 360–362.

the land for irrigation, but it is apparent even to a casual observer that the valley was extensively inhabited in former times.

The town of Solomonsville is situated in the valley on the site of two extensive ancient ruins, now leveled. There are ruins lying

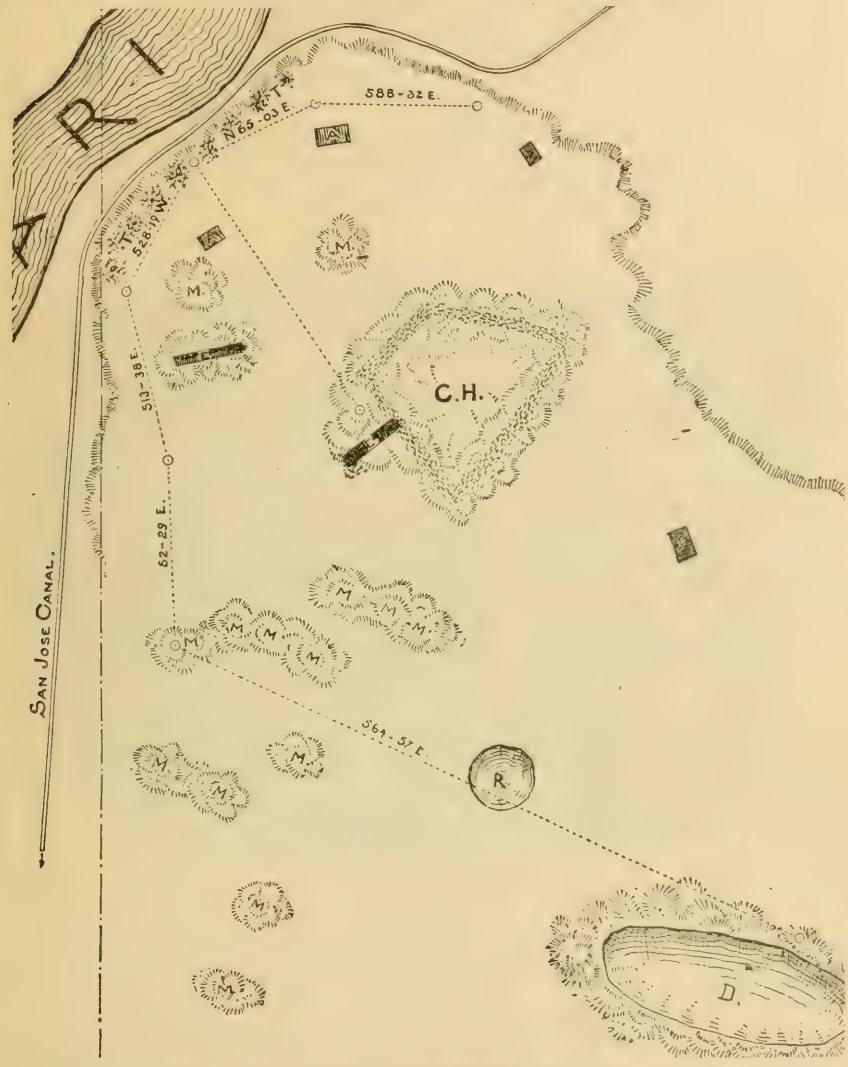

FIG. 3. Plan of Buena Vista ruin, Graham county, Ariz.

higher up the valley, notably that at Olney's ranch, and that near San José. The last-named ruin consists of a number of separate buildings and one large "reservoir." On the gravel terrace also are found numerous plots of ground from which the stones have been picked to outline the borders of gardens.

Near San José the Gila Bonita creek enters the river from the north, and high up on this stream are houses built in niches in the cliff. These cliff-houses were explored by Charles F. Solomon, of Solomonsville, and Prof. W. S. Devol, of Tucson, and an account was published in the *Graham County Bulletin* about 1895.

Many of the ruins in the Pueblo Viejo valley were located by Dr. J. Walter Fewkes and the writer during the explorations of 1897.[a]

No. 5. Pueblo.—A pueblo called Buena Vista is situated in the vicinity of San José, a village on the river above Solomonsville, Graham county, Ariz. This is a stone pueblo of many rooms arranged around a central plaza; it contains also detached houses and a large

FIG. 4. Arrow polisher, Graham county, Ariz.

"reservoir." The location is a high bluff above the Gila, and apparently the place was long occupied. An ancient ditch ran at the foot of the bluff. Doctor Fewkes says:

> Surrounding this larger stone inclosure there lie at intervals low mounds, some of which betray evidences of rooms, while others are simply ash heaps. Two large circular depressions, a few hundred feet from the central building, are conspicuous. The limits of the cluster of mounds which compose Buena Vista could not easily be determined, and probably no two persons would agree upon their extent.
>
> The largest and most conspicuous ancient building is an irregular stone structure which is situated somewhat back from the edge of the bluff, and is now

[a] See *Twenty-second Report of Bureau of American Ethnology*, pt. 1, 168–192.

used for a corral. The walls which composed it have tumbled down, but enough remains to indicate its ancient form. Apparently it was formed of many rooms, which were built about a central plaza; stones were extensively used in its construction.

This ruin was explored by Dr. J. Walter Fewkes in 1897.[a]

There are other smaller ruins near the San José settlement.

No. 6. Pueblo.—" Epley's " ruin, near Solomonsville, on the road to San José. This is a large adobe ruin, with high central mound. It has been mostly leveled during agricultural operations and the making of adobes. The site is especially rich in stone artifacts, large quantities of which were piled about the borders of the space while

FIG. 5. Ceremonial stone slab, Solomonsville, Graham county, Ariz.

much had been carried away. They consisted of manos, metates, grinding stones, polishers, arrow smoothers, axes, and hammers. Specimens of pottery were comparatively few, and usually were in the form of mortuary vases containing charred bones.[b]

No. 7. Pueblo.—In the suburbs of Solomonsville, on the right bank of the main irrigating ditch, is a ruin which formerly was large, but at present much of the village débris has been washed away. The

[a] Important collections from sites in this valley were secured by Doctor Fewkes and the writer in 1897. (See *Twenty-second Report of Bureau of American Ethnology*, pt. 1, 171–172, and plan, pl. LXVI.) The specimens are in the U. S. National Museum, many of them displayed in the Pueblo court.

[b] *Twenty-second Report of Bureau of American Ethnology*, pt. 1, 171.

mound, however, is comparatively intact, and yields from time to time pottery and skeletons.[a]

No. 8. *Pueblo.*—Situated 7 miles south of Solomonsville, on Mr. Henry J. Olney's ranch, at the foot of Mount Graham, is a ruin with stone walls. It consists of several mounds along low ridges above an arroyo, and the site has been excavated at different points by curiosity seekers, who have exposed a number of rooms during their work. The chief and most important feature of this ruin is a splendid spring which shows at points traces of walls by which it was confined.

FIG. 6. Ceremonial stone slab, Solomonsville, Graham county, Ariz.

No. 9. Pueblo.—On Peter Anderson's farm, near Solomonsville, two or more large adobe mounds formerly existed, but they were leveled to prepare the fields for irrigation.[a]

No. 10. Pueblo.—On Lem. Place's ranch, situated 2 miles west of Solomonsville, are traces of mounds and the stone cores of walls.[a] From this ruin a remarkable stone tablet "of irregularly rectangular form, with a bird's head carved on one edge, and the tail on the other," was secured (fig. 6).

No. 11. Pueblos.—Near Thatcher, Graham county, 10 miles from Solomonsville, are several sites on cultivated fields and the ruins are mostly leveled.[a] Near Pima, which is at the western end of the valley, are other ruins.

A collection of stone implements from these sites was sent to the National Museum by Mr. J. H. Carlton (cat. no. 98, 613–642). Farmers in the vicinity frequently plow up pottery and other relics, and these are generally sent to the museum at Salt Lake City, Utah.

No. 12. Pueblos.—Near Old Camp Goodwin, Graham county, are several ruins. Like most of the ruins in this part of Arizona, they are small and relatively unimportant. They are usually overgrown with large mesquite trees and mammoth cacti. Bandelier states that

[a] *Twenty-second Report of Bureau of American Ethnology*, pt. 1, 173.

very heavy metates of black and a roughly worked stone image were discovered here. (Final Report, pt. II, 411.)

No. 13. Sacrificial cave.—In the northern slope of Mount Graham is a large cave descending into the earth abruptly by a series of offsets in volcanic rock. It is difficult to penetrate, but in some parts the rocks have been smoothed by contact with the bodies of messengers bearing offerings. Doctor Fewkes says, in reference to this cave:[a]

> There were bushels of prayer sticks on the floor, and a few fragments of basketry rewarded the search. The fragments of basketry were made with a technique similar to that of the basket placques of the Middle mesa. The prayer sticks were painted red at their extremities, about the size of a penholder. This cave, called Adams's cave, has been rarely visited since its discovery by Mr. B. B. Adams, of Solomonsville, but will well repay a visit by an archeologist. There is little doubt that there are other similar caves on the northern side of the Graham mountains which have not been entered by white men.

No. 14. Pueblo.—Not far from Old Camp Grant is a ruin which may be that identified by Bandelier as Chichiltic-calli, "red house," seen by Coronado in the year 1540. Coronado was much disappointed to find that Chichiltic-calli—

> of which so much had been told was nothing but a ruined house without roof, which, however, appeared to have been fortified. It could be seen that this house, built of red earth, was the work of people who were civilized and had come from afar. . . . The name Chichilticalé was formerly given to this place, because the priests found in the vicinity a house that had been inhabited for a long time by a people that came from Cibola. The soil of that region is red. The house was large, and appeared to have served as a fortress. It seems it was anciently destroyed by the inhabitants.[b]

Bandelier says that the Sobaipuri had their villages within a short distance of Aravaipa creek, and inclines to the belief that "red house" was a village of this stock. Casa Grande, near Florence, he contends, does not fulfill the conditions.

The National Museum has from the ruins at Camp Grant a collection of shell ornaments, arrow points, and other relics, donated some years ago by Chris. Nelson (cat. no. 198, 315–326).

No. 15. Pueblos.—Surg. R. T. Burr, U. S. Army, has described ruins in White River canyon, Cochise county, Ariz., 35 miles south of Camp Bowie. (See *Smithsonian Report* for 1879, 333–334.) The ruins are of the checkerboard type, with walls of adobe and core of bowlders. Rings 3 feet in diameter floored with flat stones exist in the ruins.

Little is known of the ruins of Cochise county, which extends from the southern border of Graham county to the Mexican line, beyond the existence of small sites on the San Pedro between Benson and

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[a] *Twenty-second Report of Bureau of American Ethnology*, pt. 1, 177–178.

[b] Cibola, 160–162, quoted by Bandelier, Final Report, pt. II, 408.

Redington. Urn burials have been found at Tombstone, and the pottery is of the coarse brown Pima type. The Mexican Boundary Commission found few ruins along the border. Exploration of the region, with special reference to the ruins along the San Pedro which formed part of the route of the Coronado expedition, is desirable.

3. THOMAS-CARLOS REGION

This region may be considered an extension of the Pueblo Viejo Valley region, as it is in the same zone and shows similar artifacts. For the purpose of restricting the territory covered herein, and not to convey the idea that a culture boundary occurs on the eastern margin of the Tonto basin, the author has assumed an arbitrary limit running north along the uplift that divides the southern course of Tonto creek from San Carlos river.

No. 16. Pueblo and ditch.—Eight miles south of Fort Thomas, Graham county, on the south side of the Gila, there is a ruin of considerable size which has connected with it a ditch 1,150 feet long and 8 feet wide, descending from the base of Mount Graham. This ditch illustrates a method of irrigation frequently practised by the prehistoric farmers of the Gila valley and other localities, where conditions were favorable. The Maricopa use such acequias to-day. Torrents flowing from the sides of the mountains are usually absorbed in the detrital materials at the bases. To secure the water, the Indians dug a ditch, intercepting the water and leading it down to their fields. Ditches of this character excited considerable discussion with regard to their use until they were explained by Bandelier. (Final Report, pt. II, 410.)

No. 17. Pueblos.—Three pueblo ruins lying north of the Gila opposite no. 16 are mentioned by Bandelier. (Op. cit., 410.)

No. 18. Pueblos.—Between Fort Thomas and San Carlos, at the crossing of the Gila on the Fort Apache road, are several small ruins with connected inclosures. Bandelier describes the walls as having two parallel rows of stones. (Op. cit., 412.)

No. 19. Pueblo.—Five miles east of San Carlos there is a ruin located "in a bottom of similar appearance to all the flats or depressions along the Gila river. A tank measuring 76 feet across and incased by a rim of stones stands among the ruins. This feature seems to be common in that section of Arizona. The pottery is in all points similar to that of other ruins." (Bandelier, op. cit., 413.)

No. 20. Pueblo.—Bandelier observed the ruins at Fort Thomas and says:

> They are distinctly of the small-house type, and rows of stones indicating low inclosures connect the mounds that denote former buildings. There I received the first impression of the peculiar checkerboard arrangement of which

I have already spoken in chapter vii, in connection with the ruins on the Mimbres and upper Gila of New Mexico. The remains about Fort Thomas are much decayed, so that it is almost impossible without excavation to reestablish the connecting lines. It struck me that the amount of stone rubbish lying about was quite inconsiderable, and that the mounds, though low, seemed to consist of compact earth. This suggests the thought that the houses, except the foundations, might have been of adobe. I was confirmed in this supposition by descriptions which an old resident gave me of the ruins at Pueblo Viejo. The largest mound at Fort Thomas measured 48 by 43 feet, and one of the sides of an inclosure was 74 feet long. With these ruins there was an elliptical depression, with raised rim or border about 6 meters in width. The dimensions of the basin or hollow were 190 by 48 feet; its depth was inconsiderable. This structure I can only suppose to have been a tank. The artificial objects bore the usual character, and the pottery was the same as at Fort Apache. (Final Report, II, 409–410.)

From a ruin near Fort Thomas the National Museum has a few specimens which were forwarded by Dr. G. H. Moran. They consist of stone implements, bone objects, and pottery. (Cat. no. 58, 184–194; 58, 589–590.)

No. 21. Pueblo.—On the site of the agency buildings at San Carlos there is an almost obliterated ruin. The school children, under the direction of Prof. S. B. Weeks, made excavations in this site and unearthed a number of burial urns, specimens of which are now in the National Museum. The pottery, like that of the Pueblo Viejo valley, is coarse brown in texture and covered with a surface wash decorated in black and red. Bandelier says (op. cit., 412–413):

The foundations are double in some places, in others single. The village, which must have covered much more ground than what I could survey, was, therefore, an aggregation of dwellings and inclosures.' A mound 0.80 meter (32 inches) high and 37 meters long by 16 broad (121 by 52½ feet) is connected with the other remains. Its surface is traversed by a double line of stone walls, showing that the rubbish mass once formed a house. This feature was new to me, and it suggested the existence of a larger central building, perhaps artificially elevated by means of an underlying platform, and connected with the rest of the settlement by walls of courts or squares. What few other buildings were visible were small houses resting on the level. The rooms of these are large in comparison with those farther north.

No. 22. Pueblo.—At Rice school on San Carlos creek, several miles above the agency, there is an extensive ruin on the northwest bank of the stream, and the Indian school is located on the site. Dr. Aleš Hrdlička informs me that ruins consisting of numerous rows of rooms oriented to various points extend from the school buildings north to the creek. Lines of stones (remains of house walls) and a mound consisting of stones now in a loose mass, surrounded by rooms, are observed here. This mound is oval and about 30 feet long, and in its rooms burials are found. Other burials have been located in different parts of the site. Cremation, and burial of the ashes in jars

were practiced here. In one portion of the site axes were found and in another metates and manos. The ruin is the largest on the San Carlos creek.

Small ruins beginning on the mesa north of the Gila extend along the river at intervals to the Rice school. Specimens collected by the pupils of the school are now in the National Museum.

No. 23. Pueblo.—On Ash creek, a branch of the San Carlos creek, are small house ruins mentioned by Bandelier. (Final Report, II, 404.)

FIG. 7. Human effigy vase.

No. 24. Cave.—In the Nantacks, a range of mountains lying north of Pima, Graham county, Ariz., a cave was discovered in 1896 by a prospector. It contained many offerings of pottery, arrows, arrowheads, and beads, placed on rock ledges of the cavern. The specimens were coated to a depth of one thirty-second of an inch with lime deposited from water, but unfortunately this coating, which fell away from the vessels with comparative readiness, was thoroughly removed by the collector. One-fourth of the find was secured by Doctor Fewkes and is now in the National Museum. A singular effigy vase from this cave has been made the subject of a special paper by Doctor Fewkes, who records the object as a product of Mexican culture. (*American Anthropologist*, XI, no. 6, 165, June, 1898.) The cave was evidently one of the many subterranean places of deposit for ceremonial offerings scattered throughout this region (see p. 18).

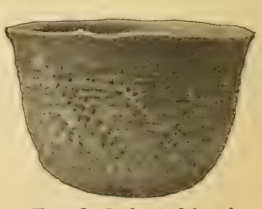


FIG. 8. Indented bowl.

Among the offerings secured are numerous disks, most of them worked from pottery, as shown by the periphery, which invariably bears evidences of rough grinding. Similar disks are found in the débris of every ancient pueblo ruin. It is thought that these objects are adjuncts of games and as such they survive in Zuñi games. (See Mrs. M. C. Stevenson, Zuñi Games, *American Anthropologist*, n. s., v, no. 3, 487, July–Sept., 1903.) The pottery, a number of specimens of which are coiled, ridged, and decorated with impressed designs is red-brown ware, sometimes polished, black inside, and devoid of painted decoration. The forms are varied, but usually small bowls, both flaring and deep and often with incurving rim, bottles, and vases. One globular vessel is studded with small conical

projections. Oblong turquoise beads like the spacers in modern Pueblo necklaces, and polished stone and shell beads were found in profusion. A large disk of white kaolin exists in the collection. The arrowheads are generally of obsidian, long, slender, finely worked, and often serrated. They are evidently sacrificial, and were made specially for offerings. The weapons and pahos were decorated with red, green, and black paint.

II.—The San Francisco River System

The San Francisco enters the Gila a few miles south of Clifton, Ariz. It rises in the Escudilla peak, west of Luna, N. Mex., and describing a semicircle, joins the Gila a little west of south of its source. It has the following principal branches: Eagle creek, Blue river, Pueblo creek, and the Tularosa river, with its main affluent, the Apache. The region is forested and well watered and contains numerous antiquities, consisting of pueblos, cliff-houses, shelters, sacrificial shrines, and petroglyphs. Everywhere, but especially along the living streams, are indications of the presence of prehistoric tribes, and thousands of artificial objects taken from the sites by curiosity seekers have been scattered. During the period of the spoliation of the ruins in the Southwest this region suffered great injury. Some collections yet remain in the care of those interested in archeology, notably a large number of specimens of pottery, stone implements, and cave material, which were brought together by a citizen of Alma, N. Mex., from the rich locality in the neighborhood of that place. The main river from the mouth of the Blue to a few miles below Reserve post-office has not been examined, but numerous caves and village sites are reported. Generally, wherever white men have selected desirable spots to locate, it will be found that the earlier inhabitants had previously chosen with equal wisdom these spots for their villages. The Indians, however, often built in canyons, like that of the San Francisco, where only a small patch of ground could be had for cultivation. On Pueblo creek, a stream flowing into the San Francisco near Alma, is one of the best preserved cliff-dwellings, and there are also sacrificial caves to be found in this region. Northeast of the mouth of Pueblo creek are many ruins, especially those near Reserve post-office (Frisco). Above Reserve the river cuts through the San Francisco range, forming a vast canyon, which has never been penetrated by man. The ruins situated along the San Francisco from Reserve to its source and those on its upper branches are described in this paper. As stated above, the course of the San Francisco farther down, to the mouth of the Blue, remains for further examination.

1. EAGLE CREEK

Eagle creek is a small stream flowing southward from the Prieto plateau and entering the San Francisco where the latter unites with the Gila. Its valley is very narrow, widening in only a few places. Owing to the character of the rock through which it flows there are numerous caves in its canyon walls. Most of these caves have not been inhabited, but some of them show considerable deposits of house refuse.

At the Double Circle ranch are reported a number of rectangular stone pueblos which have not been explored.

No. 25. Cave.—Twenty miles northwest of Clifton, Ariz., and one-half mile up a small lateral branch of Eagle creek is a cave that has been inhabited. Explorations conducted here by D. B. Horton, of Detroit, Mich., yielded sandals, cloth, feather cord, basketry, and pottery, and the specimens were sent to the National Museum by the collector. From time to time evidences of the use of some of the Eagle Creek caves by the Apaches have come to light. A number of the characteristic pitched water bottles (tos) used by this tribe have been procured from the caves, and several specimens are in the possession of Hon. Mark J. Egan, of Clifton. The extremely secluded and hardly accessible valley of Eagle creek would render it an ideal hiding place. So far as known, with the exception of Mr. Horton's exploration of a few caves, no examination of the sites has been made.

2. BLUE RIVER

Parallel with the Eagle, the Blue river runs in its narrow canyon, joining the San Francisco about 16 miles northeast of Clifton. One branch of the upper Blue runs southeast from White mountain, and this branch is perhaps the true head, as it always carries water. The north head of the Blue is found in the Mesa Prieta, about 7 miles southwest of Luna, a town on the San Francisco river. The ruins along the Blue are located on terraces above the stream, near lands suitable for cultivation; they are rectangular stone pueblos, and are generally accompanied with square kivas. Numerous small pueblos are also found on the creeks flowing into the Blue, but there are few caves, because the rock is not of the character to permit this kind of erosion.

There is abundant water in this valley, and the climate is equable, so that agriculture could have been carried on by the Indians with the greatest returns. Although the valuable farming land was limited the pueblos are, in the main, large and from various evidences were long inhabited.

From Clifton, Ariz., along the San Francisco to a short distance above the mouth of the Blue there are a few ruins of the rectangular pueblo type, which are noted under nos. 26–32 in the following pages.

FIG. 9. Sketch map of Blue river, Arizona, showing location of ruins.

No. 26. Pueblo.—This ruin is located on the bluff overlooking the town hospital of Clifton, Ariz. Rough volcanic rocks almost cover the site, and among them the rooms were built without attempt at orderly arrangement. Some of the dwellings were formed by picking out loose masses of lava from a small area and piling them up around the sides to build the walls.

The pottery is chiefly brown, and consists of bowls with fillet rims and vessels with coiled or rugose surfaces. Some excavation has been attempted here by citizens of Clifton. At the foot of the bluff on which the ruin is located petroglyphs representing the sun, serpent, water, and other objects, have been pecked on a smooth rock face.

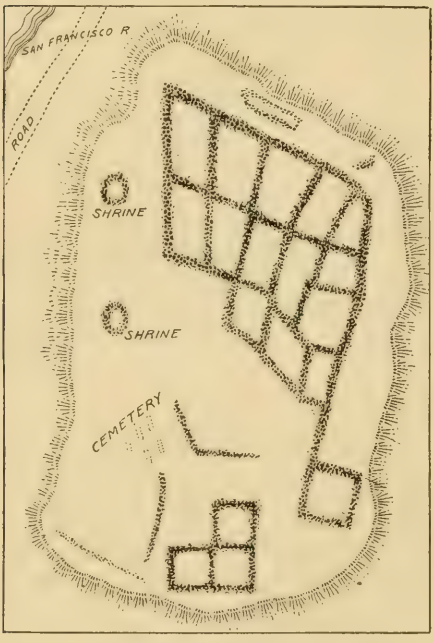


FIG. 10. Plan of ruin no. 29, mouth of Blue river.

No. 27. Pueblo.—Opposite the Potter ranch, 2½ miles northeast of Clifton, the low mounds of a ruin may be seen occupying a point overlooking the San Francisco, whose valley here contains many acres of fertile land. Excavations undertaken by several persons have brought to light a few artifacts which are similar to those found in the ruin at Clifton. The metates on this site are of the usual oblong shape, and some of the pottery shards furnish examples of excellent coiling.

No. 28. Pueblo.—Two and one-half miles above no. 27, and approximately the same size, is a ruin located on a mesa, across which at the rear of the pueblo runs a dry-laid stone wall. It is reported that cremation burials have been unearthed on this site.

No. 29. Pueblo.—At the junction of the Blue and San Francisco rivers, 16 miles above Clifton, there is a ruin lying one-eighth of a mile west of Carpenter post-office. It consists of rectangular rooms forming one large house group and several small ones irregularly arranged on the level summit of a bluff. There are two shrines on the edge of the bluff, which is walled in several places. The cemetery has numerous dry walls in the ground, and these structures are evidently not the foundations of houses. The burials were made among these walls and the bodies were laid out full length. The

pottery is of three varieties—gray, coiled brown with polished black interior, and coiled. Many of the specimens of the gray ware have the form of birds and animals.

No. 30. Walled cave.—On the San Francisco 1½ miles above the mouth of the Blue is a well-preserved cave house or walled cave. It is formed in a stratum of yellow tufa, at an elevation of about 500 feet above the river, and opens on a sloping ledge which tops a sheer cliff. The cave is about 15 feet deep and is closed by a neatly laid wall. The narrow door, doorstep, and the wooden lintel are still intact. Some débris remains on the floor of the cave, but all artifacts have been taken away by relic hunters. Adjoining the cave on the east is

FIG. 11. Walled cave near mouth of Blue river.

an oval recess having in the floor a number of holes. This milling room is decorated with a rain-cloud design in red ocher.

One hundred yards southeast of this site is a large cavate shelter showing no traces of houses, but containing quantities of flint flakes, fragments of rather good pottery, and other evidences of human occupancy.

No. 31. Pueblo.—This large ruin is located on the terrace opposite the Stockton ranch house, about one-half mile from the ruins just described. It was a polygonal stone pueblo, made up of several house masses irregularly disposed along the back of the level terrace, leaving a plaza 100 feet deep in front of the houses. On the plaza

are several circular stone-walled "wells" 3 feet in diameter. The shards thickly strewn on the site are brown, red, and gray varieties of pottery of the better class. Full-grown mesquite trees flourish in the ruins of the houses.

No. 32. Cave shrine.—In a cliff on the south bank of the San Francisco, about 1 mile below the Stockton ranch, there is a shallow two-story cave formed by erosion. The upper story of the cave contains a large quantity of broken and decayed arrows, bows, and other relics of ceremonial deposits, but the lower story is washed by the river during high water, and therefore contains no artifacts.

No. 33. Pueblo.—Near Pigeon creek, a branch of the Blue entering

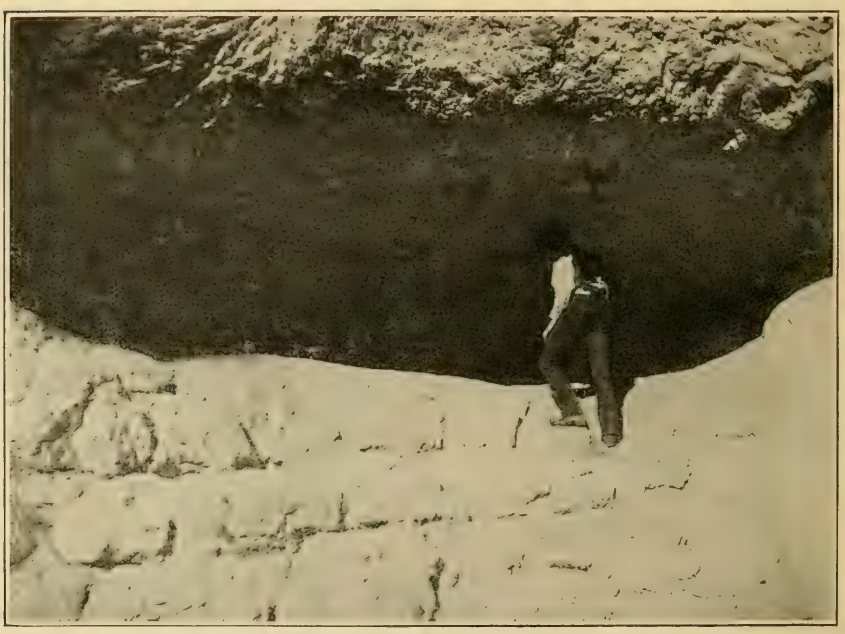


FIG. 12*a*. Milling cave near mouth of Blue river.

that stream 9 miles above the mouth, is a small rectangular stone ruin located on the wide flat above the river. The ground plan is perfectly regular and homogeneous and gives the impression that the ancient Pueblos when they erected buildings on smooth, level ground laid them out with geometric accuracy.

No. 34. Pueblo.—On the east bank of the Blue, 12 miles from the mouth and 1½ miles south of the Fred Fritz ranch, is a stone pueblo, the northwest corner of which is rounded like a bastion. The ruin is located on a broad river terrace and consists of a number of rooms built around a court. It measures 100 feet north and south and 75 feet east and west. On the smooth plaza in front of the ruin are two circular "wells" and three shrines, the latter lying a short distance

from the southeast corner of the building. No kiva was observed on this site. Many flakes of pure white chert and numerous shards of black, gray, red, and brown pottery are scattered around the ruin. Coiled pottery with scratched ornamentation appears to have been prevalent here.

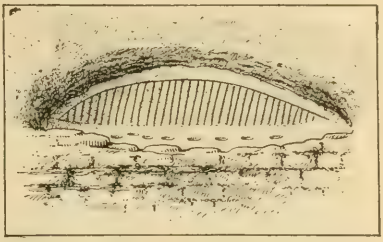


FIG. 12*b*. Plan of milling cave.

On the terrace below the ruin just described there is a smaller ruin consisting of a few houses the foundations of which are scarcely traceable. In spite of the inaccessibility of these ruins they have been found and disturbed by relic hunters.

No. 35. Caves.—On the west side of Blue river, opposite the J. S. Johnson ranch, 5 miles above no. 34, are several caves, two of which,

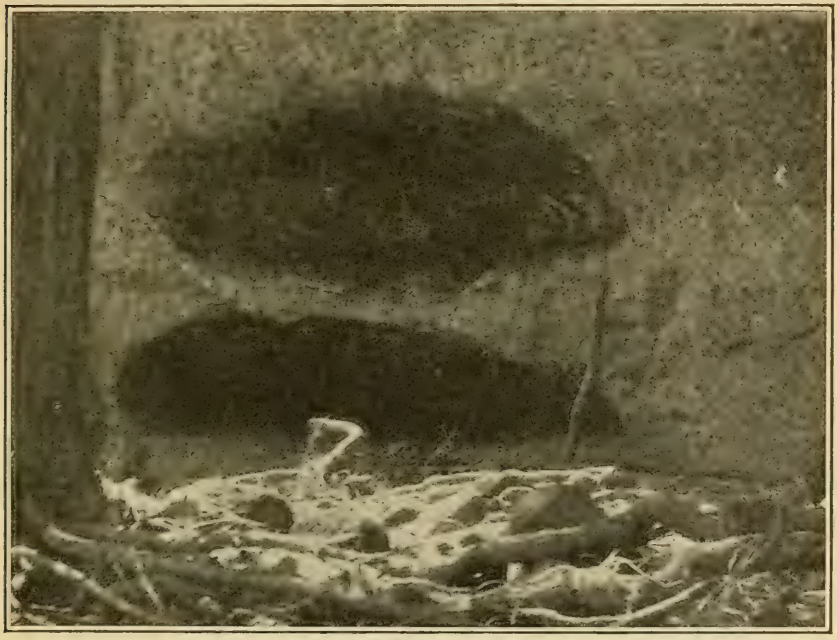


FIG. 13. Two-story ceremonial cave, San Francisco river near mouth of Blue river.

located in the summit of a high point overlooking the gorge of a torrent, have been occupied. The upper cave has a small, inconspicuous opening of circular shape looking out on a narrow ledge hundreds of feet in the air above the stream bed. The opening is just large enough for the passage of a person wriggling through, and the sides are worn smooth by the struggles of those who entered at former

times. The cave consists of a number of low chambers extending 50 feet into the rock. Beneath the rear chamber is a room which is ventilated by means of a chimney built on the floor of the upper chamber. The interior of the cave is blackened with smoke and the floor is strewn with large rocks, between which have been placed great numbers of bows, arrows, carved staffs, cigarettes of cane, and beads, such as are found in ceremonial caverns of this region.

This cave was discovered two years ago by a prospector, and subsequently thoughtless persons took from it quantities of painted bows and arrows, which they abandoned on the ledge to be destroyed by the elements.

Beneath the cave described is another, which was discovered by the Museum-Gates expedition of 1905. It consists of a single chamber piled almost roof high with red dust and the droppings of rodents. Many artificial objects of great interest were found in these caves.

No. 36. Cliff-dwellings.—Near the Johnson Ranch house are the remnants of an extensive village located under a great mass of overhanging rock. Unfortunately the site has been inclosed as a goat corral, and the animals, in conjunction with man, have almost obliterated the ruin. The remaining walls are of small flat stones laid in mud, and they still retain the plastering with which they were covered. On the talus of the ruin are many fragments of pottery and chert, and during farming operations several years ago some skeletons were disturbed in the débris. (Pl. 1.)

No. 37. Pueblo.—On the "saddle" above the Johnson Ranch house the faint outlines of a large pueblo may be traced. The site is very irregular, being broken by fantastic masses of rock. The bulk of the village was located therefore on the north slope, which is comparatively smooth. Numerous houses were also located in nooks under the cliffs, and some of the spaces between huge blocks of fallen rocks were walled up to form habitations. Great quantities of fragments of good pottery are scattered about, and many flakes of a white stone, resembling novaculite, derived from a neighboring hill, were observed. That this imposing rocky point was an important center of ancient pueblo activity is apparent from the large body of excellent agricultural land in the vicinity, which can be irrigated with but little labor.

No. 38. Cave.—One and one-half miles above the Johnson ranch, on the east bank of the Blue, is a cave located near the bed of the stream. The very high water of February, 1905, soaked its contents, rendering them useless for purposes of investigation. The deposit of refuse is large and consists of ashes mingled with fragments of basketry, sandals, and many other objects cast away by the former inhabitants.

Remains of plastered walls

Remains of doorway

RUINS OF CLIFF-DWELLINGS, JOHNSON RANCH, BLUE RIVER

No. 39. Cave.—At Robert Bell's ranch, near the mouth of Squaw creek, a cave said to have been inhabited is reported, but no examination of the site has been made.

No. 40. Pueblo.—On the terrace opposite the Lovelady ranch, on Stray Horse creek, 27 miles above the mouth of the Blue, are the remains of a large, well-planned pueblo. This is the most extensive ruin in the neighborhood of Bear Creek ceremonial cave, described under no. 43. It measures 225 feet by 220 feet and is not of the compact variety (see plan, fig. 15). The site is covered with large juniper trees, some of which, of advanced age, have taken root in the aban-

FIG. 14. Ruin on Lovelady ranch, Blue river.

doned houses. Among the trees on the outskirts of the ruin is a stone pillar, which was evidently set up by the inhabitants of the village, but for what purpose is not apparent. Tentative excavation here brought to light several skeletons (fig. 16), but no pottery or other objects had been deposited with them; the shards on the surface of the ground, however, are of the usual Blue River type.

No. 41. Cave.—On Tornado creek, 1½ miles above the Lovelady ranch, there is a cavern divided into rooms by thin walls of stone. The ceiling of the cave is low, and the floor is not much above level of the stream, which occasionally flushes a portion of it. Some pottery was taken from this cave by persons living in the neighborhood.

No. 42. Pueblo.—Two small sites exist on spurs jutting out into the farm land of J. H. T. Cosper, 28½ miles above the mouth of the Blue and 15 below Blue post-office. There are about 10 house plans on each site. Several other small pueblos exist in this vicinity, two of them on the west side of the river opposite Bear creek and one on the east bank. A small cave may be seen in the cliff one-eighth of a mile below Cosper's house.

No. 43. Sacrificial cave.—This cavern, which is locally called Montezuma's cave, is on Bear creek, near the Cosper ranch. Bear creek emerges between two lofty, massive, basalt-capped buttes of strange form that stand like monuments on the east side of the Blue. These

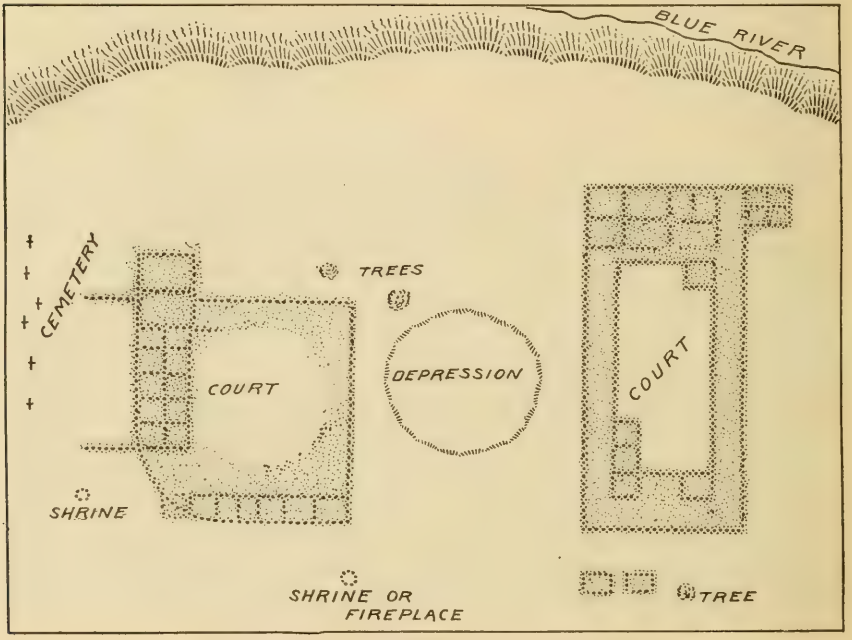


FIG. 15. Plan of ruin on Lovelady ranch, Blue river.

pinnacles are fitting portals to a canyon which, though short and shut in by very steep walls, contains natural scenery worthy of the highest admiration for its combined beauty and grandeur.

The impressive character of this section of Blue river, which shows on every hand evidences of tremendous plutonic activity, can be scarcely paralleled in any other portion of the Gila-Salt region, and perhaps the ancient Indians were influenced by these circumstances to select it as a central sacred place. Besides, the canyon of Bear creek was inaccessible except over a single trail, which could be and actually was closed by a stone wall pierced by a narrow passage; it had cool water and abundant shrubbery, and was in every respect an ideal place of mystery.

High up in the wall of the canyon, at 1½ miles distance from the Blue, is a great cave whose portal is a low uniform arch 60 feet wide opening on a ledge 15 feet wide. The cave has a floor area of about 10,000 square feet embraced in a front section semicircular in shape and a rear section which extends diagonally to the west. Owing to the large entrance the front cave is well lighted, but the rear cave is dark and inhabited by bats. The ceiling is in the form of a dome about 12 feet high, and from the sides spring curves which merge into the ceiling and have the appearance of massive groining. The floor

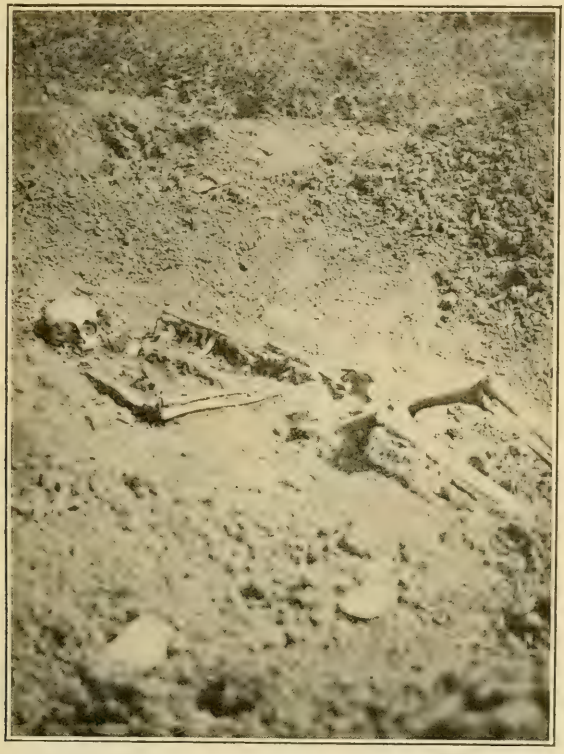


FIG. 16. Burial showing position of skeleton, Lovelady ranch, Blue river.

is covered with a large deposit of gravel mingled with dust and the excreta of animals. In this débris there were found numerous pits about 3 feet square, each a shrine in which were placed ceremonial offerings. Immense quantities of such objects had been deposited here, and the whole mass of débris averaging 2 feet in depth was filled with them. In the upper portion of the mass the offerings were intact, but lower down they had disintegrated. The offerings were bows and arrows of natural size and in miniature, painted rods, carved staffs, baskets, tablets, flutes, beaded flutes, cane cigarettes, pahos of many kinds, torches, models of clothing, cloth, colored cord, sandals, beads, game dice, votive pottery, and many other objects.

This, the greatest of all known ceremonial caves in the Southwest, was discovered accidentally about eleven years ago, and since that time much of its valuable material has been carried away by visitors and much destroyed by individuals who dug niter from the rear cave. Visitors were accustomed to provide light for examination of the cave by burning such offerings as could be gathered together for the purpose, and it is only because the accumulation of materials was so great and visitors not numerous that anything remained here for science.

There are other large caverns near the Montezuma cave, but these were not utilized by the Indians. The single trail and entrance to the canyon are guarded by a wall having a gateway, and among the rocks at this point may be seen traces of house plans. Just beneath the capstone of the pinnacles which stand at the entrance of Bear creek are small cliff-houses (pl. II), and on the now inaccessible apex of the north spur are cairns and fragments of stone causeways once thrown across fissures in the rock.

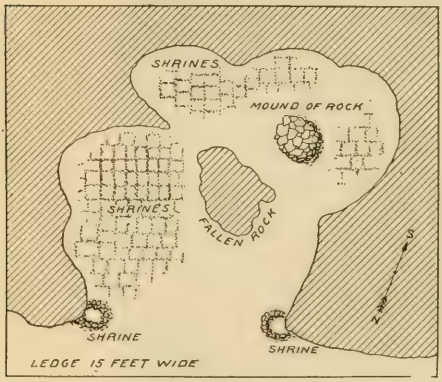


FIG. 17. Plan of Bear Creek cave, Blue river.

Everywhere in the canyon and neighborhood are traces of the presence of man in the fragments of pottery and obsidian scattered over the ground, and it appears certain from all considerations that this locality was the ceremonial center which drew worshipers from pueblos throughout a large region.

No. 44. Cave.—In the box canyon 5 miles above Cosper's is a small cave in the bluff, about 20 feet above the road. It contains a framework of posts and rafter poles and is divided into two rooms by a stone wall. In the cave are great quantities of débris, as vegetal substances, bones, and other refuse, rejected by the inhabitants.

No. 45. Pueblo.—This pueblo is on the west side of Blue river, near the mouth of Fish-hook creek, 6 miles below Blue post-office. It is located on the high terrace above the river, is built of stone, and consists of two rectangular sections. It has a circular depression near the south end. Judging from the condition of the ruin and the advanced decomposition of the building stone of which it was constructed, this pueblo is very ancient. The fragments of pottery, obsidian, and chert lying about the site are abundant and of good quality.

CLIFF-HOUSES, BEAR CREEK, BLUE RIVER

No. 46. Pueblo.—On John Castos's ranch, 1½ miles above the last location and north of Grant canyon, there is a large stone pueblo located on the mesa north of the creek.

No. 47. Pueblo.—This pueblo lies 1 mile southeast of the George Thompson farm on the high hills above the river.

No. 48. Pueblo.—Located on the west side of the river between the Thompson and Cornet farms, 5 miles south of Blue post-office. The site is a high terrace above the river, and the ruins consist of several house masses, of which the plans may easily be traced It is very extensive, and the largest house mass is situated on a high vantage point overlooking the marshy land of the river bottom.

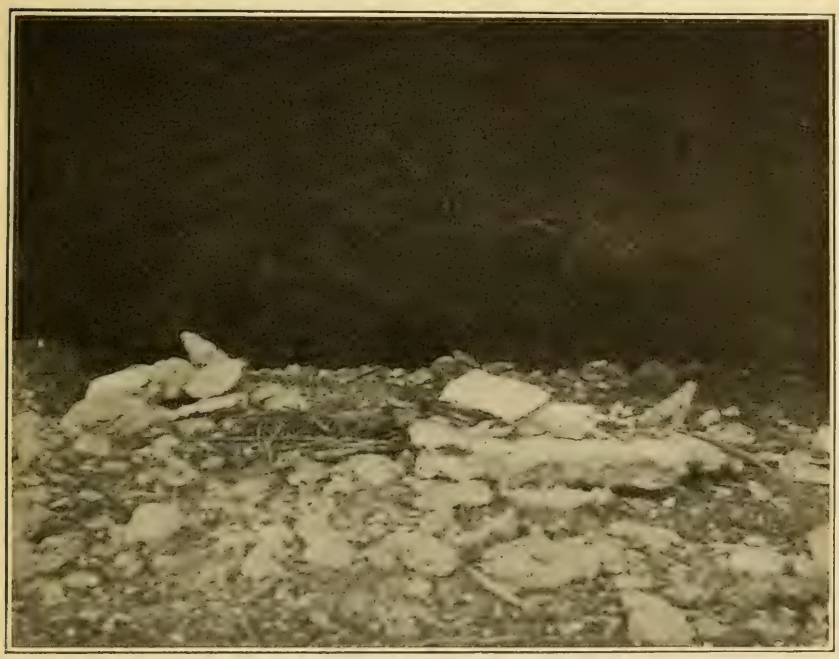


FIG. 18. Bear Creek cave, Blue river.

The ruin is one of an important group of 5 located on this terrace; a description of the others follows in nos. 49 and 50.

No. 49. Kiva.—This remarkable ruin consists of a chamber 60 feet square, and at present 5 feet deep, sunk in the level terrace. The sides are laid up with stone built on a slight slant, and a graded way 10 feet wide, paved with slabs, leads down into the kiva. The entrance is located on the east side, and the débris near the opening seems to be that of guardrooms. This is the first structure of this character found on the Blue above the mouth, and presumably it was the kiva of the Foot Creek group.

No. 50. Pueblo.—The remaining numbers of the Foot Creek group are three rectangular stone pueblos of fair size occupying sites north of the kiva (no. 49). They are built of slabs of gray volcanic rock, which is found abundantly in the vicinity.

No. 51. Caves.—There are three small caves in the canyon wall on the west side of the Blue near the mouth of the Foot and Lamphre creeks. They were anciently used by men as shelters, but in recent times they have been bear dens.

No. 52. Petroglyphs.—These figures represent bear tracks, deer, men, dragon flies, stars, and other objects pecked in the face of the rock near Henry Jones's ranch, 4½ miles below Blue post-office.

No. 53. Pueblos.—These ruins, several in number, are in the neighborhood of Henry Jones's ranch, and one of them is close to the dwelling house. They are of the usual rectangular plan and present no unusual features.

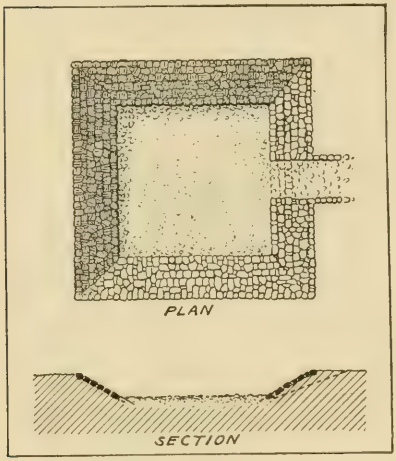


FIG. 19. Assembly kiva of group near Thompson farm, Blue river.

No. 54. Pueblo.—The location is a ridge near the cultivated fields of the Jackson farm, 3½ miles south of Blue post-office. The ruin is large, of rectangular plan, and of gray stone. The site contains little rubbish and the stones of the fallen walls are scarcely weathered; the ruin to all appearance is more recent than any other on the Blue. Some years ago men engaged in cutting a ditch along the margin of this site unearthed a skeleton and pieces of pottery.

No. 55. Pueblo.—This is a small ruin 3¼ miles south of Blue post-office, located on a bench above the river between Cedar Spring creek and Brush creek. The pueblo is small, rectangular, and stone built. Numerous fragments of pottery and other material, together with stone chips, are scattered over the site.

No. 56. Pueblo.—Near the Thomas farm, 3½ miles south of Blue post-office, is a ruin of medium size, placed on the second terrace above the river. It is rectangular in plan, built of stone, and well located. A large open area in front of the pueblo is level and contains many fragments of pottery and obsidian. This ruin has never been excavated.

No. 57. Pueblo.—On Brush creek, about 2 miles above its junction with Blue river, there is reported a rectangular stone ruin.

No. 58. Pueblo.—On the Snyder farm, 2½ miles south of Blue post-office, is a rather large rectangular stone pueblo lying in the slope above the county road. This pueblo, on account of its contracted site, is rather compact. No excavation has been made here.

No. 59. Pueblo.—Near the schoolhouse, 2 miles south of Blue post-office, is a small stone pueblo. A few years ago some pottery and skeletons were found on the site after high water in the river had carried away a portion of the terrace. This is the only pueblo seen in the mountain region which shows a lack of judgment in choice of location.

No. 60. Pueblo.—Situated about 1½ miles south of Blue post-office, opposite the Adair place (T. 3, R. 31 E.), is a small rectangular pueblo, 50 by 75 feet, with 16 large rooms. The small stream called Indian creek enters the Blue at this point, and the ruin is located on a second terrace above the river. On the rocks through which the stream breaks are well-executed petroglyphs, consisting of bear tracks and symbolic designs. Indian creek was probably the route of an early trail to the mountains west of the Blue river.

No. 61. Pueblo.—About three-fourths of a mile up Indian creek is a group of three rectangular stone pueblos of medium size, lying on the south bank of the stream. These ruins are respectively 100 and 200 yards apart on the gradually ascending terrace. The uppermost ruin is located on a stratum of rock. Some years ago a skeleton and a few specimens of pottery were found on the south side of the upper ruin by James S. Johnson.

No. 62. Pueblo.—At Blue post-office, Graham county, is an important ruin situated on a point just back of the residence of C. B. Martin. This point is the extremity of the river terrace which extends to the base of the high hill standing south of Centrefire creek. The four house groups constituting the ruin are crowded together on the prolongation of the terrace, from which a good view may be obtained of the cultivated fields along the river immediately north and south of this location. The decay of the houses has produced mounds which at present stand several feet above the terrace level, but so great quantities of the building stones have been removed from the site for employment in the construction of Mr. Martin's houses that the plan of the ruins is difficult to trace. Aged alligator juniper trees grow in the ruins and give one the impression that the pueblos were abandoned many centuries ago. Only two shrines were observed in the vicinity of the ruin. They consist respectively of a stone ring and a pile of small angular and waterworn stones.

Back of the village the terrace expands into a broad and level area, gently rising to the base of the malpais-capped hill which bounds the river valley on the west. Much of this space was devoted to the exterior cemetery, which begins close under the walls of the houses.

The soil is deep and rich, having been formed by an accumulation of house refuse, now mostly disintegrated, reaching to a depth of 6 feet at some points. The roots of large juniper trees have penetrated the soil and disrupted many of the interments. Well to the rear of the cemetery is the ruin of a large square kiva like the one near Foot creek, described in no. 49. In front of the kiva the house refuse is deep and contains many fragments of pottery, but no interments had been made in this portion of the site. The cemetery contained many burial walls, a feature which seems to be common in this region. About 4 feet beneath the surface on the north side of the cemetery was found a metate set up on a base of stones, neatly plastered on the exterior, and surrounded with a rim of clay. (Pl. III.)

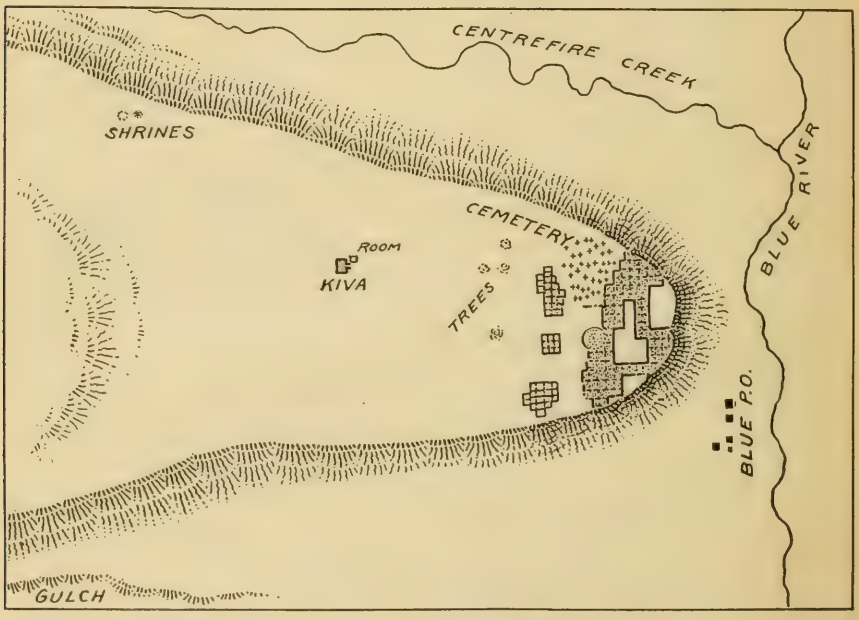


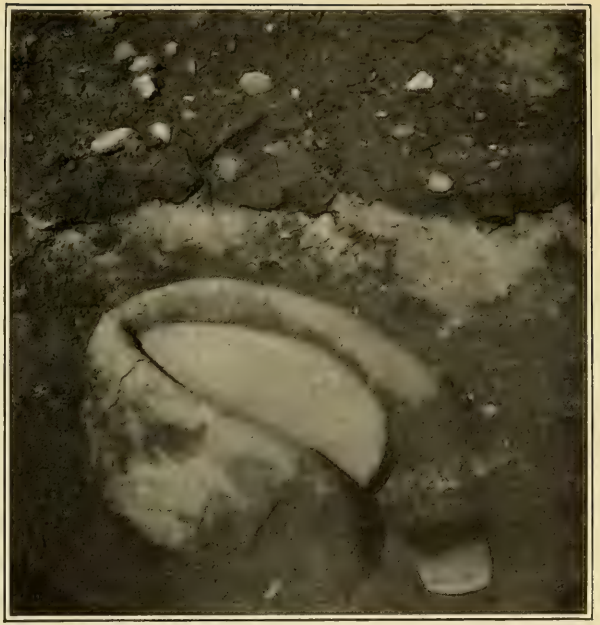
FIG. 20. Sketch of ruin at Blue post-office, Blue river.

A hand stone accompanied the metate, and it is presumed that the apparatus was connected with mortuary rites. The majority of the interments were at full length, and in nearly every case objects of pottery, stone, and shell were deposited with the dead. In the spaces between the houses and also in many of the rooms there were interments.

In the immediate neighborhood of the Blue ruin are a number of small sites, several of them lying on the slope north of Centrefire creek, and others on the east and west sides of the river below the village.

Extensive excavations were carried on here by the Museum-Gates expedition of 1905, through the courtesy of Mr. Charles B. Martin,

Front view



Side view

METATE DISCOVERED IN CEMETERY OF RUIN AT BLUE POST-OFFICE

the owner of the land. The specimens secured are in the National Museum.

No. 63. Pueblo.—Near the mouth of the Campbell branch of the Blue river and on a point back of "Bobby" Jones's house, 9 miles above Blue post-office, there is a rectangular pueblo of good size. Other small ruins occur along the road leading over the plateau to Luna.

3. PUEBLO CREEK

Pueblo creek is a small stream flowing southeast from the Mesa Prieta, through very broken country, into the San Francisco river a few miles above Alma, N. Mex. Its valley furnishes no agricultural

FIG. 21. Construction of wall, ruin at Blue post-office, Blue river.

land, and it is probable that the evidences of habitation there indicate only a temporary or periodical occupancy for ceremonial observances or for hunting. The artificial objects found are similar to those observed in the neighboring regions.

No. 64. Cave.—On Pueblo creek, Socorro county, N. Mex., 9 miles southeast of Blue, Ariz., and in the Gila River forest reserve, is a large cave under the huge cliffs of Saddle mountain. Although quite difficult of access, it was entered some years ago by John Cosper, who found bows, arrows, painted tablets, and other objects arranged, according to his description, in orderly manner around the walls of the cavern. He also states that the floor was clean, and it was

thought that the place had been used by the Indians as an armory. There is, however, no reason to believe that the cave was used for other purpose than for sacrificial offerings.

No. 65. Cliff-dwellings.—In the canyon of Pueblo creek, at the locality called Henkel park, 10 miles southeast of Blue, Ariz., is a row of small cliff-dwellings. These dwellings are practically intact, but are said to have been cleared of relics. One room in this series has been artificially excavated in the soft rock.

At Alma, near the mouth of Pueblo creek on the San Francisco river, numerous sites have been reported, and south along the river at Lone Pine and Whitewater are several larger and other smaller ruins.

4. LUNA VALLEY

This beautiful valley, which is watered by the San Francisco river, lies on the western confines of Socorro county at an elevation of about

FIG. 22. Grinding stones (first two rows), manos (third row), metates (last row)—all from Blue post-office, Blue river.

8,000 feet above sea level. It was settled some thirty years ago by Mexicans of the well-known Luna family, but the early settlers were driven away by Apache depredations which resulted in considerable loss of life. Later the valley was occupied by Mormons, who located their farms on the fertile lands and built the town of Luna. The valley is a typical basin of the high mountain plateaus. It is rimmed on the north side by basaltic cliffs and bounded on the south side by gently sloping hills, which rise to the divide between the San Francisco and Blue rivers. At the east end of the basin the river enters a box canyon, emerging some 5 miles below Los Lentes valley (Spur ranch).

The ruins of Luna valley consist of artificial caves in the rim and in the walls of the canyon and rectangular or polygonal stone pueblos in the open country. The pueblos are generally located on the second

terrace above the river and are built in connection with a square kiva, like those which are found on Blue river some 25 miles south of Luna valley.

Two other anomalous ruins of great interest have been discovered in Luna valley. The site of one of these shows on its smooth surface no trace of its former occupancy except small fragments of brown pottery. It has been found, however, that the ruin consists of a number of circular semisubterranean houses. This ruin covers many acres and is apparently of great antiquity. Another remarkable ruin is found in the canyon east of Luna, where numerous walls, mounds of stone, and like evidences of human labor exist, but the site does not contain any fragments of pottery or flint which invariably were found in ruins heretofore examined.

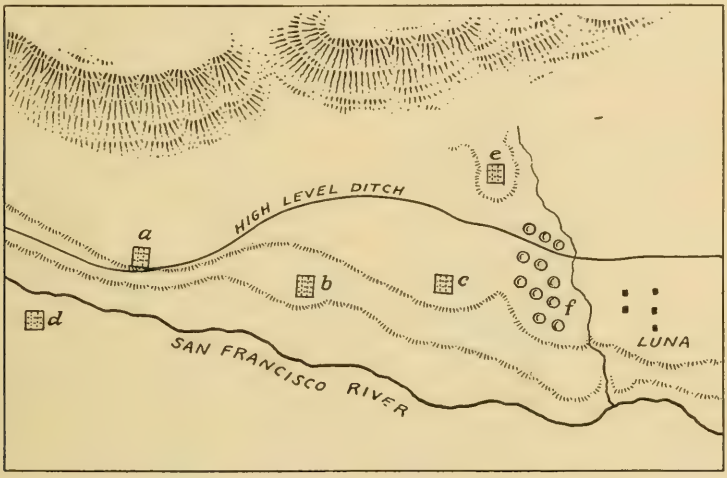


FIG. 23. Sketch of location of ruins near Luna, N. Mex.: *a*, *b*, *c*, *d*, *e*, rectangular stone pueblos; *f*, village of pit-houses.

Ruins are reported on the high mountains at the source of the San Francisco river, and there is said to be on Mount Thomas a sand altar containing many beads of different colors.[a] From the elevated region to the west the Indians obtained abundance of copper carbonate which they used as a pigment.

No. 66. Village site.—Three hundred yards west of the store at Luna is a large tract of almost level land, lying above and below the main high level ditch and west of a small "wash" separating the store from the Thompson house. Many acres of this land are covered with fragments of coarse, brown, undecorated pottery, among which occurs rarely a fragment of cream-color ware with waved or linear decora-

[a] The Pueblo Indians to this day deposit offerings in shrines on the summits of high mountains, and beads are the customary sacrifice.

tion in brown pigment. The surface of the site gives no indication of habitation nor are any building stones to be seen. (Fig. 23, *f*.)

In cutting the main ditch a number of years ago a skeleton, accompanied with rude pottery, was found here. It was ascertained by the Museum-Gates expedition of 1905, through test excavations and a close examination of the ground, that this site was once occupied by circular subterranean houses, nearly all superficial traces of which have disappeared, the soil having been slowly leveled by natural agencies. It is believed that the ruin is very old and that it antedates the stone pueblos of this region. Two other ruins of this character lie about 5 miles north of Luna, at the Funderburg and Stevens cienagas. (See nos. 74, 75.)

No. 67. Pueblo.—This pueblo is located one-half mile northwest of the store at Luna, on a rocky point back of the Thompson pasture. It is a rectangular stone pueblo, with very little débris surrounding it. (Fig. 23, *e*.)

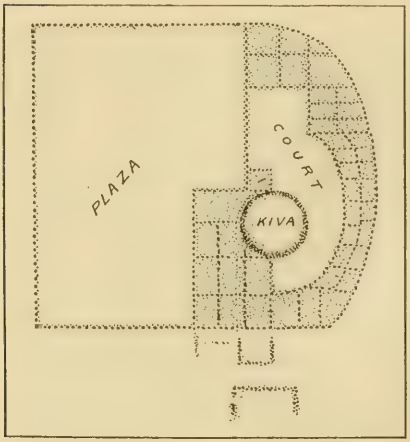


FIG. 24. Plan of ruin C, one-half mile southwest of Luna, N. Mex.

No. 68. Pueblo.—One-half mile southwest of Luna, among the pines on the rocky second terrace above the San Francisco river, is a pueblo measuring 120 feet north and south and 125 feet east and west. The west end consists of an L-shape courtyard, bounded by rooms of large size built around a circular depression. Nothing rewarded excavation here, and from appearances the ruin was not long inhabited.

No. 69. Pueblo.—One mile west of Luna on the first terrace above the San Francisco river, on land of Charles Adair, there is a rectangular stone pueblo in extreme decay. The cemetery is on the southwest side of the pueblo and the burials are in very hard ground.

No. 70. Pueblo.—Two miles west of Luna on the Old Adair place there is a large stone-built pueblo, situated on the second terrace above the San Francisco river. (Fig. 23, *a*.) The house plans are almost indistinguishable under the great mass of débris of decayed walls, but the exterior stepped (polygonal) outline may be traced. The ruin measures 180 feet east and west, and 110 feet north and south; the west half of the pueblo is solidly built.

The northeast section has a kiva 30 feet square with an entrance, on either side of which is a room, and adjoining this kiva is a circular depression 30 feet in diameter. In front of these depressions lies

a cemetery and back of them is a row of rooms which forms the northern boundary of the pueblo. The bodies were buried at full length; the pottery is of Blue River type and shows considerable variety of form. This pueblo was evidently the most important of those in the neighborhood of Luna.

No. 71. Pueblo.—West of Luna 2½ miles, on the south bank of the San Francisco, and to the east of the road to Alpine, is a small ruin of a pueblo, which was built of stone. It is said that a skeleton was unearthed here in digging the ditch which traverses a field below the ruin. Burials are frequently discovered in many sections of the Southwest through farming and irrigation operations.

No. 72. Cave.—Below Luna, on the south side of the canyon about 1 mile from the entrance and located high up in the basalt cliff, is a cave which was entered a short time ago by Mr. Thompson, of Luna, who found a pottery vase. In the basalt rim around Luna valley also are several small caves, which have been found to contain sacrificial bows, arrows, cigarettes, and other customary offerings.

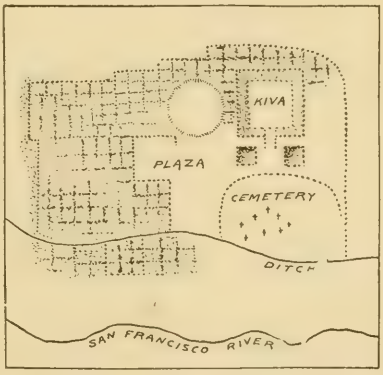


FIG. 25. Plan of ruin A, Luna, N. Mex.

No. 73. Pueblo.—On the south side of the canyon, about 1½ miles below the cave (no. 72), are numerous house plans, concavities, and lines of rock piles, occupying the narrow bench above the river and extending one-quarter of a mile along the canyon. The stones employed by the builders have been almost weathered away, and it is remarkable also that a diligent search for hours failed to yield a trace of pottery, flint chips, or any evidence of human occupancy of the site, although the surface of the ground was bare. This interesting ruin is enigmatic, since the absence of pottery around a structure of this character in the Southwest is exceptional. One might suggest that these extensive constructions were made by a people unacquainted with the use of pottery. As it was not feasible to conduct excavations on this site, the problem of this ruin may be reserved for later investigation.

5. LOS LENTES VALLEY

East of Luna about 7 miles is Los Lentes valley, a deep basin about 4 miles long, across the lower end of which runs the San Francisco river. It is evident that in earlier times this basin was a lake and later a cienaga. It lies under the San Francisco range, is quite

isolated, and it has on its northern margin in the neighborhood of 50 ruins, consisting mainly of shallow, circular depressions termed "reservoirs." Nearly all these ruins are oriented to the northeast.

On the principal ruin are located the buildings of the Spur ranch.[a] (See no. 77.)

A perennial stream called the Rita Blanca enters Los Lentes valley from the north, breaking through a malpais mesa. In its canyon, about one-half mile above the ranch house, is a row of small cliff-dwellings, a large portion of which has been destroyed by falls of rock from the overhanging cliff. To the north this stream widens out into several ample valleys, containing a number of ruins.

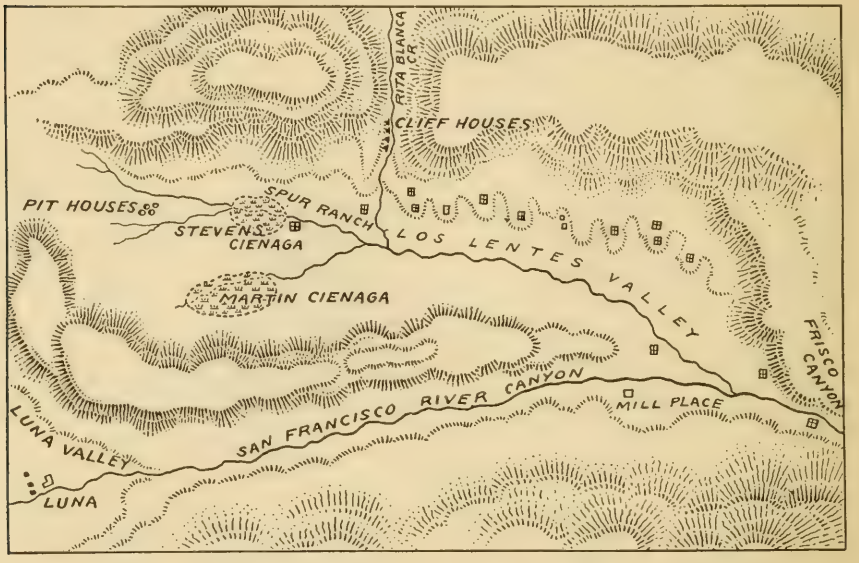


FIG. 26. Sketch of Spur ranch, Los Lentes valley, showing location of ruins.

About a mile west of the ranch house is a ruin located on a terrace above a cienaga. This ruin is remarkable in having been built upon an earlier ruin, in which the houses were circular and semisubterranean; on sand hills at the head of this cienaga is a village containing only houses of the circular type.

In the springs of Los Lentes valley are found many bead offerings, especially in the hot spring in the canyon of the river to the southeast of the ranch. In one of the ruins, lying above an arroyo which descends from the Freeborn mountains, human remains were found in clean gravel at a depth of 8 feet, under a layer of hard-jointed clay; hence it would appear that this burial was of great antiquity.

[a] Through the courtesy of Montague Stevens, esq., the writer was permitted to excavate the interesting ruins on the Spur ranch.

Accompanying the remains were fragments of deer bones and rude flint chips. These remains, together with the presence of semisubterranean houses, render this valley and the neighboring Luna valley extremely interesting to the archeologist.

Los Lentes valley, except on the south, is particularly isolated, and it is here that one would expect to find remains of a tribe or tribes left unhindered to pursue a normal development, in the ruder stages depending for subsistence chiefly on game and at a later stage, with a knowledge of the agriculture of maize, using this cereal as an economical basis of support. The remains show, however, that the ruder pit-dwelling tribes of the valley were superseded by tribes from the south, who built rectangular pueblos of stone.

No. 74. Village site.—At the head of Stevens cienaga, 2 miles west of Spur ranch, on a sandy point of a ridge sloping down to the level sagebrush land, is a ruin consisting of numerous circular depressions distributed over a large area of graded ground. No building stone was employed here, but much earth débris intermingled with artifacts covers the site. Fragments of brown, cream-color, gray, and coiled pottery, together with obsidian and chert, were found scattered over the ruin, and among these are masses of burnt clay, bearing impressions of roof material. About 120 yards to the northwest of the ruin is a rectangular structure of four rooms; this is situated among the pine trees, and no fragments of pottery are to be found around it.

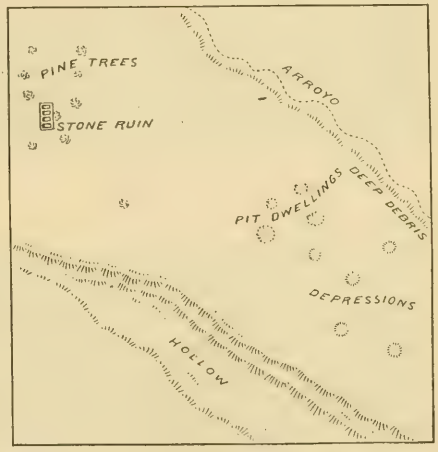


FIG. 27. Plan of ruin, at head of Stevens cienaga, showing pit-houses and grading.

No. 75. Pueblo.—On the border of the Stevens cienaga, 1 mile west of Spur ranch, there is a rather large rectangular stone pueblo situated on a terrace above the spring in the cienaga. It consists of a cluster of contiguous rooms partly on level ground and partly on the slope of the terrace. Adjoining it is a circular depression 50 feet in diameter, and to the south are two detached houses, each containing several rooms.

On the west and southwest sides of the pueblo are graves, the central portion of this cemetery being used for the burial of children. During the excavations here several circular semisubterranean houses (like those of no. 74) were discovered.

No. 76. Pueblos.—Small pueblos occur in the pine forest south of the Spur Ranch valley. They consist of two or more rooms and are not so numerous as those on the north side. Similar sites may be seen in the woods which extend between this place and Luna.

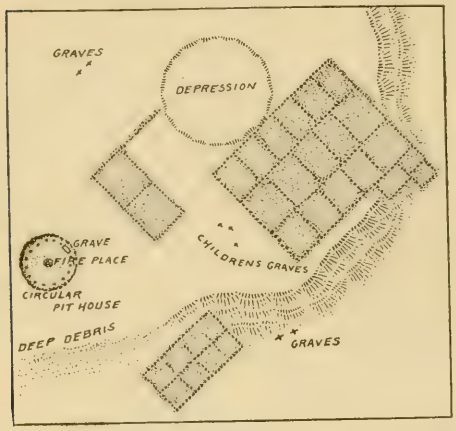


FIG. 28. Plan of ruins on Stevens cienaga, showing rectangular stone houses superimposed on pit-dwellings.

No. 77. Pueblo.—On the west side of Rita Blanca, near its mouth, is situated the chief ruin existing in this locality. This ruin is made up of a number of polygonal house masses ranged on the gentle slope extending southwest from a high, lava-capped mesa which bounds the valley on the north.

This slope has been graded to furnish level areas for the houses and in every part of the site there are evidences of an incredible amount of excavation, still discernible after farm occupation of many years. The ruins of the largest house mass form a high mound containing rooms of unusual size and a large circular kiva 8 feet deep. (Pl. IV, *a*.) Adjoining this mound is a large "reservoir." South of this much of the ruin has been cleared away and the stones laid in the walls of an immense shed called locally galera, erected by the Mexican settlers on the foundation of a portion of the pueblo; for this reason the galera extends in a northeast direction. South of the galera few traces of walls remain, this condition being the result of the long-continued occupancy of the site by the great Spur ranch.

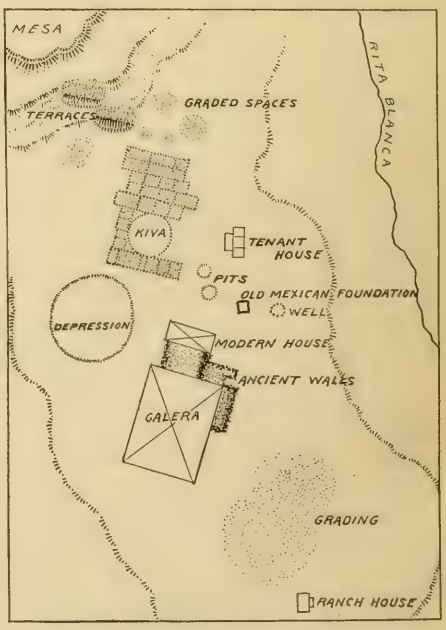
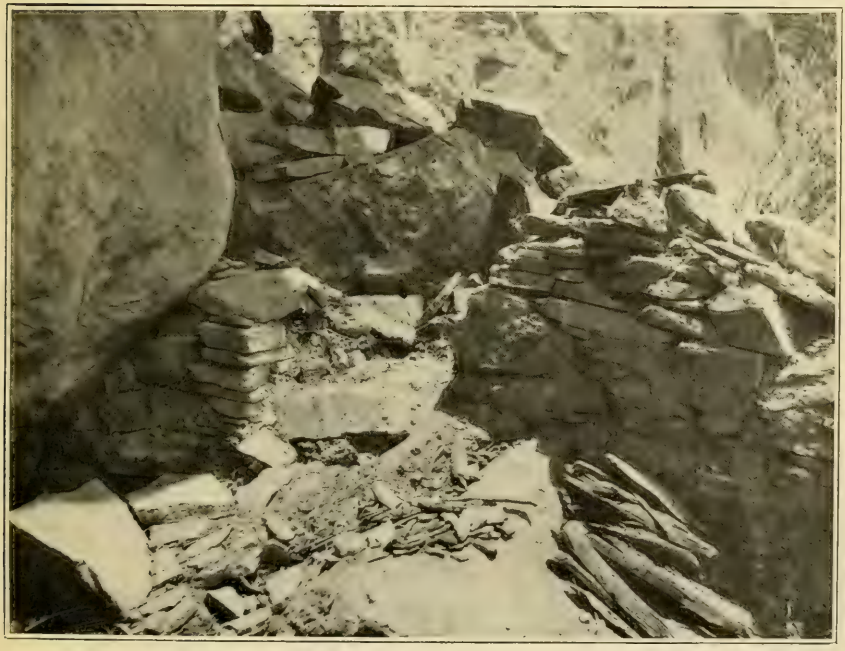


FIG. 29. Plan of Spur group, Spur ranch.

No. 78. Cliff-dwellings.—On Rita Blanca, one-quarter of a mile north of Spur Ranch house, is a ruin consisting of a row of houses

a Fireplace exposed in ruins



b Remains of cliff-house, showing masonry, Rita Blanca

RUINS IN SPUR RANCH GROUP

under a high cliff at the top of the talus. Hardly any walls remain above the débris and large masses of rock have fallen into some of the houses. Some wooden posts stand in the ruins. Excavations were made here by R. M. G. Dill, esq., a number of years ago, and in 1904 by the writer. On the smooth cliff face are pictographs in red, the subjects depicted being among others the sun and the mountain lion. (Pl. IV, *b*.)

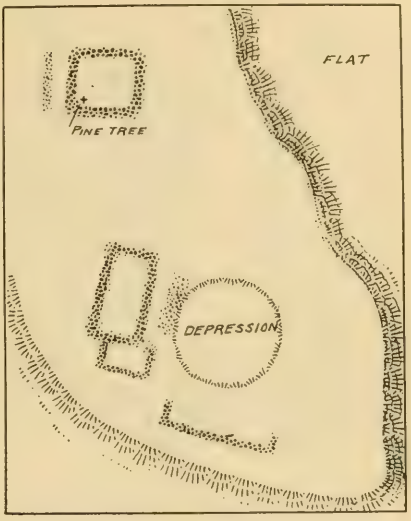


FIG. 30. Plan of ruin no. 80, Spur ranch.

No. 79. Pueblo.—On Rita Blanca, about 2 miles north of the Spur Ranch house, the country opens out above the canyon and in the valley are several small ruins. One of these, situated on the slope above an abandoned Mexican ranch house, has large quantities of refuse around it and many fragments of obsidian and pottery of good quality.

No. 80. Pueblo.—On the point southeast of Spur Ranch house is a ruin consisting of a single room 18 feet square in which a pine tree has grown, and south of it is found a "reservoir" 4 feet deep and 20 feet in diameter. The "reservoir" is flanked on the west by rooms and on the south by a stone wall.

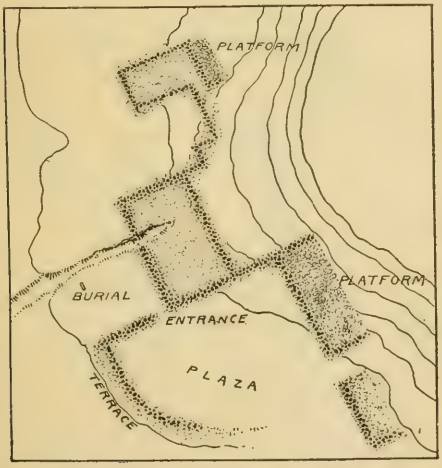


FIG. 31. Plan of ruin no. 81 on hillside near Spur ranch.

No. 18. Pueblo.—This pueblo ruin lies one-eighth of a mile northeast of the Spur Ranch house, on the hillside just below a talus of slabs of volcanic rock which furnished the building material. The rather steep slope was graded and the pueblo built on the platform thus prepared. The ruin is 122 feet long and 65 feet wide.

Excavations carried on here revealed the great extent of the masses of débris surrounding the ruin. The débris lies on the clay hardpan which is commonly encountered in excavations on the terraces of the

valley. One pit was carried down into the hardpan, and in this stratum the remains of a badly eroded human skeleton were encountered. No pottery or other artificial objects accompanied the bones.

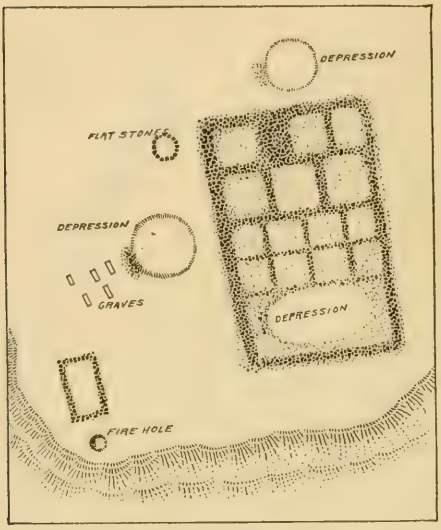


FIG. 32. Plan of ruin no. 82, Spur ranch.

No. 82. Pueblo.—One quarter of a mile south of the Spur Ranch house there is a rectangular ruin 65 by 102 feet, situated on the slope 15 feet above the level bottom land. This slope and the terrace surrounding Los Lentes fields are composed of angular and subrounded detritus. The building stone is a red brown volcanic rock which occurs in slabs and blocks, and the remains of walls lying on the surface are now deeply covered with lichens, indicating a long subjection to atmospheric and vegetal agencies. The boundaries of the exterior walls of the ruin can be followed with some degree of accuracy, but the arrangement of the rooms is not clear, on account of the débris which covers them. The débris forms a considerable mound at the western end of the ruin, where originally the pueblo was not less than two stories high. The house refuse is large in amount and contains chips of chalcedony and very little obsidian. The pottery is brown and red, the latter polished and the former decorated with scores traversing narrow coils.

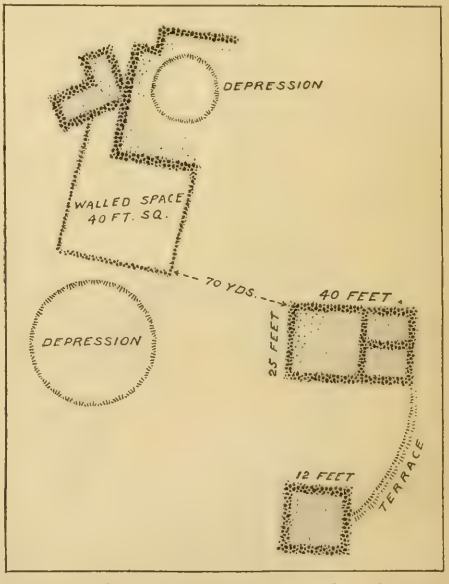


FIG. 33. Plan of ruins no. 83, Spur ranch. The upper ruin shows successive constructions.

No. 83. Pueblos.—One mile southwest of the Spur Ranch house are two small stone pueblos situated on a spur of the terrace which overlooks the cultivated land. They are rectangular, and adjoining them are circular "reservoirs."

No. 84. Pueblo.—One and three-quarter miles southeast of the Spur ranch house is a stone pueblo 18 feet square, located on the spur above the fields; north of the ruin is a large circular depression and to the east of the house mass are graves.

No. 85. Pueblo.—This ruin is of an L-shape house mass inclosing the west and south sides of a shallow circular depression. There are also small houses on the east and north sides of the depression. The point on which the ruin is located is fenced off by a stone wall, and on the slope below the ruin are two shrines containing remarkable amorphous quartz concretions and crystals.

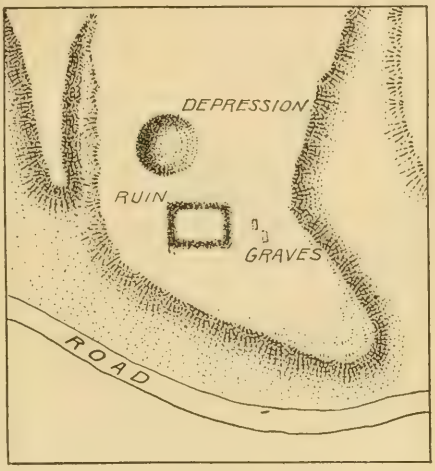


FIG. 34. Plan of ruin no. 84, Spur ranch.

No. 86. Pueblo.—One-fourth of a mile east of no. 85 may be seen a stone ruin whose mound is higher than usual. It is situated on a high bluff rising above an arroyo which descends from the mountains to the north. A portion of the edge of the bluff is walled. East of the ruin is a shallow circular depression; north, a wall 30 feet long and two shrines, each consisting of a heap of small stones; and southeast, a shrine and a second depression. The ruin is one of a group of 5 situated on the points of the ridges above the arroyo. The largest of this group measures only 45 by 30 feet, and though the ruins are not far apart each has its individual shrines, "reservoirs," and cemeteries. Like most of the Spur Ranch ruins those here described are oriented to the northeast.

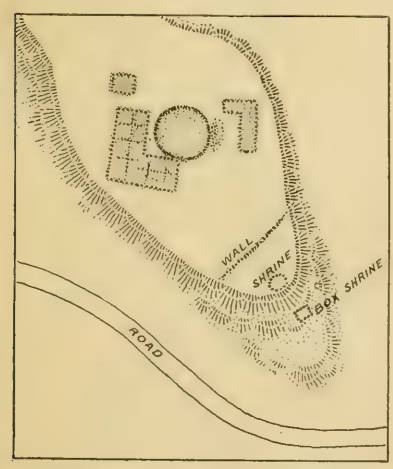


FIG. 35. Plan of ruin no. 85, Spur ranch.

No. 87. Pueblo.—This member of the Arroyo group is located on the high ridge east of the arroyo, and consists of two rectangular house masses having between them two circular basins. The upper house measures about 30 feet by 27 feet, and near it are ancient graves. This house was built over the foundations of an earlier

building, whose rude walls were oriented due east and west, while the later building follows the customary orientation. In a number of instances among the Spur Ranch ruins evidence was secured going to prove that frequently former constructions were razed, the sites being regraded and built upon. For this reason the burials which customarily were made in the accumulations of débris near the houses are represented only by fragments of skeletons and pottery dispersed in the soil. Excavation at this place as on sites similarly affected was productive of few material results. In one pit, however, which was sunk below the zone of soil containing human artifacts, the remains of a human skeleton accompanied with deer bones and rude flint flakes were encountered. The remains were in clean, hard-packed, coarse wash gravel, which to all appearance retained the characteristics of its deposition from water. The position of the find suggests antiquity.

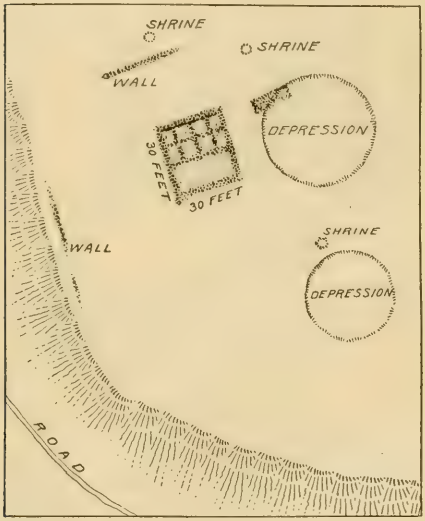


FIG. 36. Plan of ruin no. 86, Spur ranch.

On the higher portion of the ridge on which this ruin stands is a shrine, and near it a number of large stones rudely aligned. (See fig. 38.)

No. 88. Pueblo.—A small ruin exists in the flat below no. 86, near the foundation of an old Mexican house. (See fig. 38.)

No. 89. Pueblo.—Lying on the north side of the valley halfway between the ranch house and the San Francisco river is a ruin consisting of two rectangular house masses adjoining a "reservoir." A short distance to the north of these ruins is a terrace, at the rear of which is a heap of stones, and to the south are two shrines filled with stone concretion offerings.

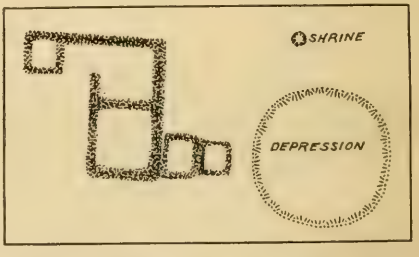


FIG. 37. Plan of ruin C, Arroyo group, Spur ranch.

No. 90. Pueblo.—This ruin lies on the south side of the valley 2½ miles south by east of the Spur Ranch house, near the San Francisco river, at "Mill Place." It is merely a rectangular stone ruin 45 by 51 feet in dimensions and does not possess a "reservoir."

No. 91. Pueblo.—On the river bottom opposite "Mill Place" is a ruin consisting of a series of rooms bordering a quadrangular depression 48 feet square. The quadrangle has entrances from the north and is at present 5 feet deep. It appears to belong to the isolated kiva type. Another ruin measuring 21 by 15 feet lies 100 feet southeast of the square ruin. Two or more large circular depressions are connected with these ruins. There is a large deposit of house refuse on the site.

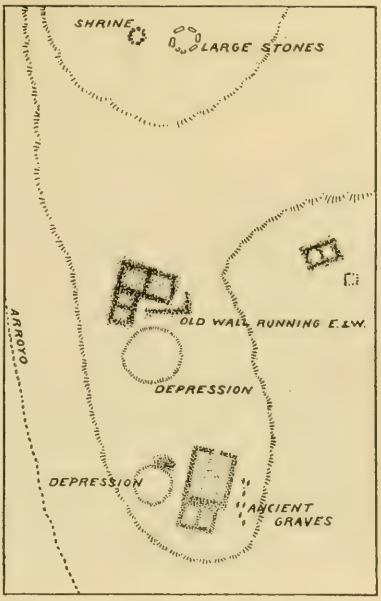


FIG. 38. Sketch of location of ruins D and E, Arroyo group, Spur ranch.

No. 92. Pueblo.—On the extremity of a high terrace, a point of which juts out opposite the "Mill Place," is situated a ruin of medium size. It is one of the regraded sites, and for this reason the excavation carried on here in 1904 by the writer was productive of few results, the débris containing only fragments of human bones and potsherds.

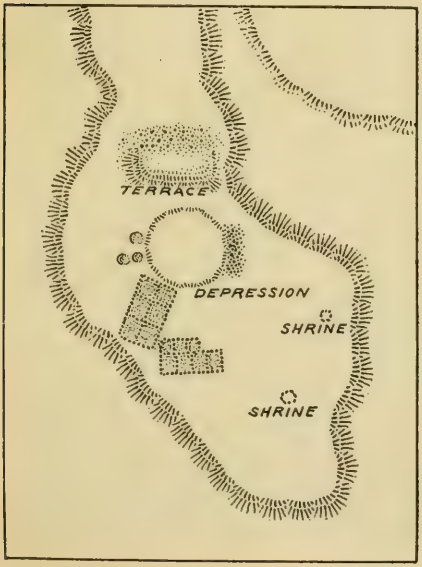


FIG. 39. Sketch of location of ruin no. 89, Spur ranch.

No. 93. Pueblo.—One-half mile east of the "Mill Place" is a comparatively large ruin situated on the second terrace above the San Francisco. The mounds of this ruin have been protected by large pine trees and thus retain the form which the pueblo assumed after it had decayed. West of the pueblo is a fertile field whose surface is strewn with fragments of pottery. At this point the river begins to descend rapidly into the canyon which lies between the Spur ranch and Reserve post-office.

No. 94. Pueblo.—In the canyon of the river below no. 92 is a small ruin situated on a broad terrace among the pines. Several minor sites are found in the neighborhood.

No. 95. Sacred springs.—One of these springs is at "Mill Place," Spur ranch on the San Francisco river; the second is the hot spring at the mouth of the deep canyon between Spur ranch and Reserve. Many offerings of stone beads have been found in the sands of these springs, but no pottery has been observed.

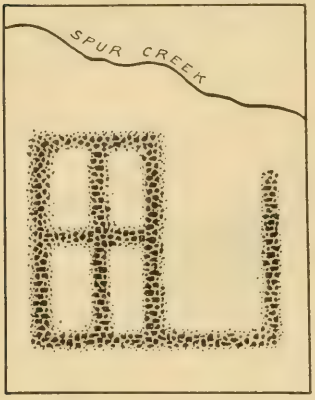


FIG. 40. Plan of ruin no. 90, Spur ranch.

No. 96. Pueblo.—In the mountains lying between Reserve and the Spur ranch stone ruins are sometimes seen along the high ridges in the pine forests. They are usually houses of one or two rooms, but occasionally the remains of a stone tower are seen by hunters. One of these ruins, presumably of a tower, lies about midway on the trail between Reserve and the Spur ranch. These forest ruins probably were hunting lodges.

6. TULAROSA RIVER

The Tularosa is a short stream flowing southwest through a picturesque country and joining the San Francisco about 4 miles south of Reserve post-office. (Pl. v, *a*.) Between its upper and lower reaches, where the river flows through canyons, lies one of the most beautiful valleys in the Southwest, whose fertile land supports many families, living principally at old Fort Tularosa, at the head of the valley, and at Joseph, near the lower extremity. In ancient times there was a much larger population who built numerous pueblos on the terraces northwest of the river overlooking the fields. The remains of these pueblos render Tularosa valley an important center of archeological interest. The valley of Apache creek, which joins the Tularosa near Joseph, was also densely populated by the same tribes who settled the contiguous valley. The Apache Creek ruins extend to the source of the stream on the southern slope of the Gallo mountains. They are compact stone pueblos, some of large size; one of these ruins near the mouth of the creek is surrounded entirely

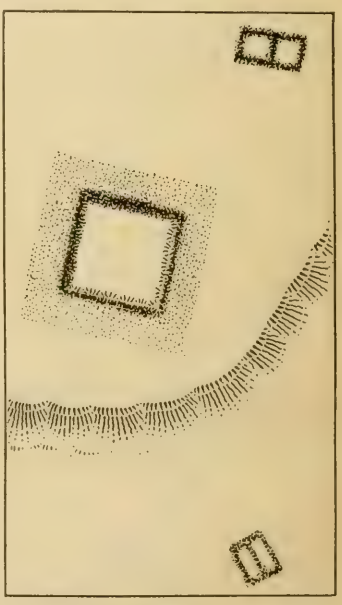


FIG. 41. Plan of ruin no. 91, Spur ranch.

a Delgar group (in left middle ground)

b Shrine with broken pottery, lower Tularosa (no. 100)

TULAROSA VALLEY, LOOKING NORTHEAST FROM MESA

by a stone wall. Especially important is the group of the N. H. ranch on Apache creek, which consists of 10 ruins and one large kiva. On Apache mountain and on the Queens head are shrines consisting of stone circles inclosing quantities of broken pottery. At the south

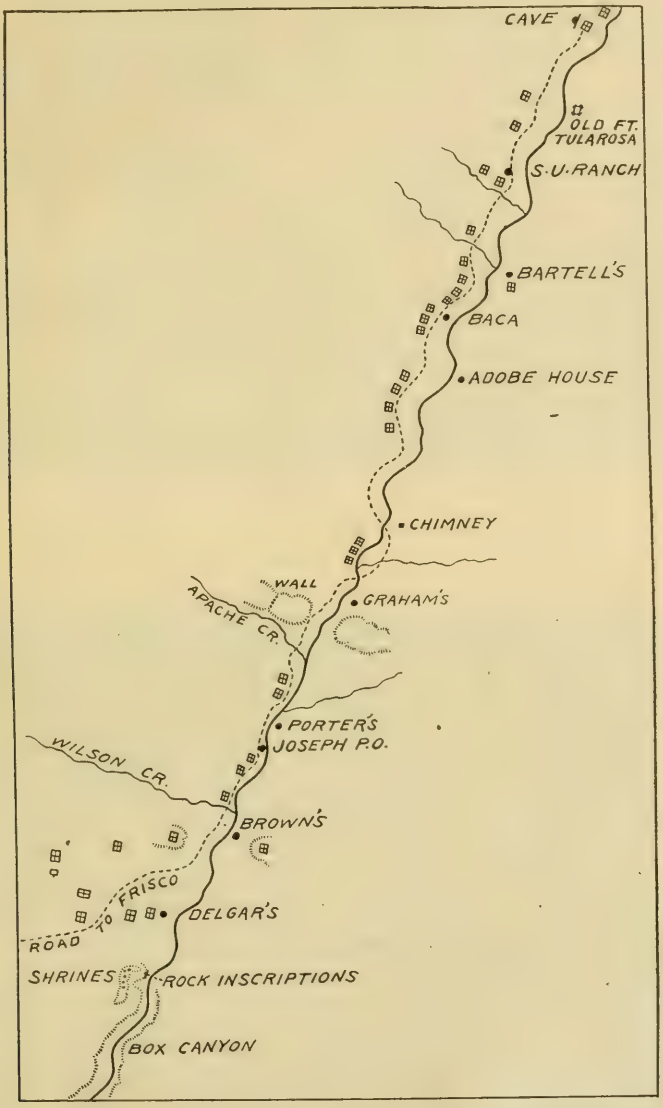


FIG. 42. Sketch map of Tularosa river, showing location of ruins, western Socorro county, N. Mex.

end of Tularosa valley there is a remarkable gallery of pictographs on the smooth wall of the canyon, and on the heights above are several circular shrines also containing masses of potsherds. The

group of large ruins on the ranch of Mr. H. S. Delgar, a short distance below Joseph, is of great interest. This group consists of four rectangular stone pueblos of the compact type and a rectangular kiva with approaches like those found on the Blue river. At the S. U. ranch one very large ruin has the appearance of a Mexican pyramid standing prominently on a terrace above the fields. In the gorge above Old Fort Tularosa is a cave formerly having a series of rooms across its opening; smaller ruins are noticed as far as the head of the river and on the various branches. Among them may be mentioned the ruin at Gallo spring, an ancient pueblo situated in a rincon of the Gallo mountains. The spring has furnished a great number of votive offerings of miniature pieces of pottery.

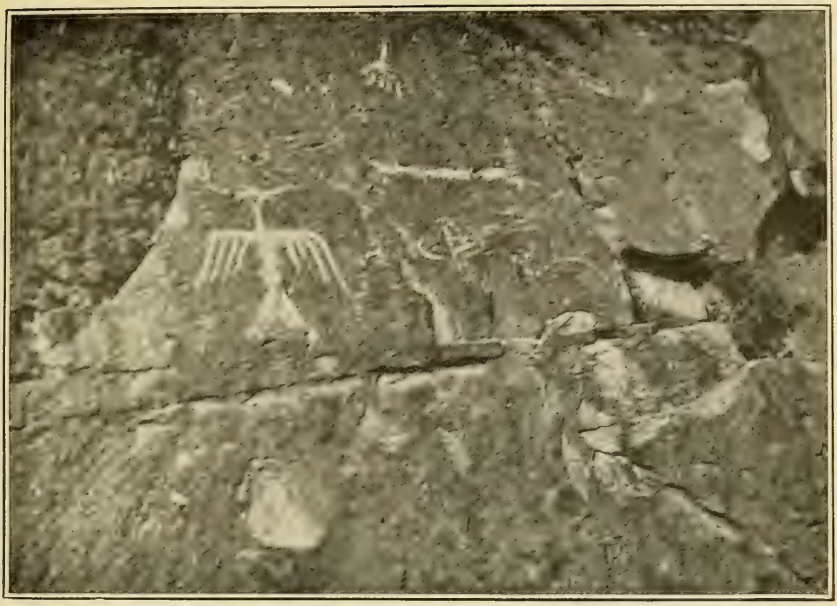
Mr. Henry Hales, of Ridgewood, N. J., explored the Tularosa canyon in 1888. A portion of his collection—objects of stone, shell, and other material—found its way into the National Museum in 1895 (cat. nos. 170528–170572). A number of excellent pieces of pottery which formed a portion of the Hales collection were secured from Mrs. Lander, of Kansas. The remainder of the Hales collection was purchased by Mr. George G. Heye, of New York. The large collection of Mr. W. J. Andrus, of Hackensack, N. J., completes, so far as known, the list of notable finds from this locality.

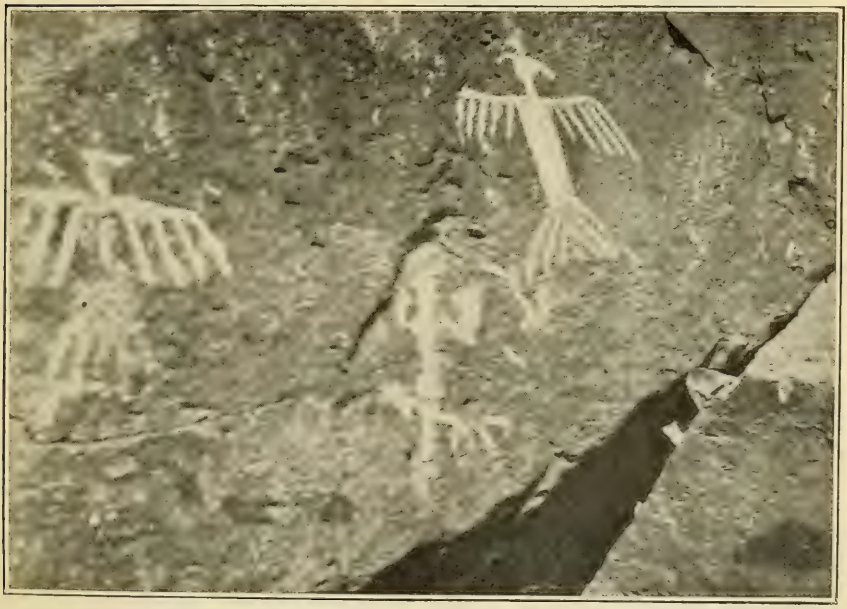
No. 97. Cave.—In the upper box canyon of San Francisco river, a short distance below Reserve post-office, Socorro county, N. Mex., there is a cave, which has not been explored, but is reported to show evidence of human occupancy.

No. 98. Pueblos.—These ruins are found near Reserve, and consist of a group of three at the Cooper place one-half mile northwest, and a group of the same number at the Higgins place, 1½ miles northwest of the town. North of Reserve one-half mile is a smaller ruin, and others occur on points of land in the vicinity.[a] The ruins are invariably situated on rounded, sedimentary terraces; they are rectangular and contain each from 4 to 23 rather large rooms. The walls are laid up with river bowlders and thin slabs of rock. One wall, exposed by curiosity seekers, is constructed of bowlders and white slabs arranged in alternate bands. Many of the lower rooms are below the present surface of the ground and may have been so constructed designedly by the builders.

The ruins were rich in artifacts, but these have been removed by speculators in relics, who demolished the ruins in the process. The only objects, so far as known, that have been preserved in museums are those secured in 1885 by Mr. E. W. Nelson for the National Museum collection. (Cat. nos. 76224–76239, 98134–98725, and 115847–115858.)

[a] On Schliess and Lagit creeks there are said to be important ruins which may be reached from Reserve post-office.





PICTOGRAPHS AT ENTRANCE OF TULAROSA BOX CANYON BELOW DELGARS

No. 99. Pueblo.—On Clement Hightower's ranch, near Reserve post-office, at the junction of the Tularosa and San Francisco rivers, Socorro county, is an interesting ruin reported by Mr. Hightower

No. 100. Shrines.—These are situated 1¾ miles below Joseph, N. Mex., near the ranch of Mr. H. S. Delgar. The Tularosa river here enters a box canyon, and on a mesa above the river, accessible at only one point, are large masses of volcanic rock. Some of these are piled in rings within which are great quantities of broken pottery. There are five of these rings. The edge of the mesa also seems to have an artificial rampart of large rocks. (Pl. v, *b*.)

No. 101. Petroglyphs.—Near the last location may be seen a remarkable series of petroglyphs, consisting of eagles, men and other figures, graven on the smooth face of the canyon wall.[a] (Pl. vi.)

No. 102. Pueblos.—This group, 7 in number, is situated on the west bank of the Tularosa 1½ miles below Joseph, western Socorro county, in part on the farm of Mr. H. S. Delgar, for whom the group has been named. They are rectangular stone pueblos located on the second river terrace a short distance above the box canyon. Four of them are very large and form a compact cluster on which stand Mr. Delgar's dwelling and some of his outbuildings. Two other pueblos belonging to this group lie to the west only 300 yards, and with them is the square kiva. The principal pueblo on Mr. Delgar's ranch covers more than 6 acres, and it was evidently the most important village in the Tularosa valley. Immense deposits of rubbish surround it, indicating long-continued occupancy. The Delgar group has been for many years the source of Tularosa pottery, and great quantities of entire specimens have been secured (broken specimens being discarded). (Pl. vii.) So extensive has been the work that it is almost impossible to ascertain the ground plan of the pueblos.

In general, the pueblos are oriented to the northeast; each has a rounded blank wall on the west, to the rear of which is the principal cemetery. Most of the houses, however, contain burials. The pottery and art works from the Delgar group are of superior design and finish, as well as of varied forms. Some copper ornaments and numerous amulets of rare minerals have been found here, of which several of excellent workmanship are in the collection of Mr. G. G. Heye, of New York City.

Mr. Henry Hales, of Ridgewood, N. J., visited these ruins in 1888 and secured a large number of relics that had been gathered by the indefatigable labors of Mrs. Delgar. This collection has been dispersed, portions of it being in the National Museum and in the private collections of Mr. W. J. Andrus, of Hackensack, N. J., and Mr. Heye, of New York.

[a] See Hales in *Smithsonian Report*, 535, 1892.

No. 103. Pueblo.—About 1 mile below Joseph, on the west bank of the Tularosa river, is a rectangular stone pueblo located on the second terrace, near the Brown farm. It is one of the very few ruins on this side of the river.

No. 104. Pueblo.—Three and one-half miles up Wilson creek, which enters the river 1 mile below Joseph, there is reported a large stone pueblo on the south side of the valley.

No. 105. Pueblos.—On the northwest of the Tularosa, between the mouth of Wilson creek and Joseph, there are three small pueblos (see map). Insignificant as these ruins are, they have been excavated.

No. 106. Pueblos.—On the Tularosa river, a short distance below the mouth of Apache creek and 1 mile above Joseph, are 5 large rectangular stone pueblos situated on a terrace above the river.

No. 107. Wall.—At the "Narrows," 1 mile above Joseph, just opposite the mouth of Apache creek, the Tularosa cuts through a high, narrow mesa, which is visible for many miles. The mesa to the northwest of the river is crossed by a stone wall, the purpose of which is conjectural.

No. 108. Pueblos.—A group of three small rectangular stone pueblos is situated on a terrace to the northwest of the river a short distance below Graham's.

No. 109. Pueblos.—On the northwest bank of the Tularosa, about 2½ miles above Joseph, are 4 rectangular stone pueblos standing on a bluff above the road and opposite an adobe house. These ruins are of medium size.

No. 110. Pueblos.—On bluffs flanking the road about 3½ miles above Joseph and the same distance below Old Fort Tularosa is a group of 9 rectangular stone pueblos. This group begins at the Baca place and extends 1½ miles northeast along the river. Some of these ruins are of good size, and a few have been worked by unknown persons. One small ruin is on the south side of the river near Bartell's. So far as known, of the many ruins on the Tularosa only three are situated on that side of the river.

No. 111. Pueblos.—At the S. U. ranch, about one-half mile below Old Fort Tularosa, there is an imposing ruin situated on the ridge which extends out into the river valley. (Pl. VIII, *a*, *b*.) This ruin stands on the top of the ridge, upon a pyramidal base which bears traces of shaping, the sides of the ridge also having been graded. The main rooms are large, and the walls well laid up with slabs of stone, some of which are sculptured on the edge. Two of the larger rooms have been excavated, and in them were found remains of the house beams. (Pl. VIII, *c*.) There is one large circular kiva on the platform outside the village. The ruin from its elevated position may be seen from a long distance; when viewed from the southwest, it resembles a Mexican teocalli. The pottery here is of good quality,

a View of S. U. Ranch ruin (no. 111), near Old Fort Tularosa

b Circular kiva at S. U. Ranch ruin

c Part of excavated room, S. U. ranch

d Ruin below cave (no. 114) at head of Tularosa valley

RUINS ON UPPER TULAROSA RIVER

a Entrance

b Section of débris in cave, showing two floor levels

CAVE AT HEAD OF TULAROSA VALLEY

and remains of shell, obsidian, chert, and beads, show that the people were comparatively wealthy. There are three or more ruins in the immediate vicinity, but they are of little importance.

The S. U. ranch formerly belonged to Montague Stevens, esq., who commendably discouraged the unscientific excavation of the ancient habitations on his property.

No. 112. Pueblo.—In the vicinity of Old Fort Tularosa, 7 miles northeast of Joseph, are three small pueblos, one of them lying in the fields on the southwest side of the river. The ruin of the old fort, which was built in 1872–74 to hold in check the Apache, may be traced on the south side of the river, near the Mexican village called Aragon's Plaza or Tularosa.

No. 113. Pueblo.—On the river bank three-fourths of a mile above Aragon's plaza and to the north of the road below the cave (no. 114) is a pueblo which lies along a rather steep ridge. (Pl. VIII, *d*.) It contains perhaps a dozen rooms and was excavated a number of years ago by a Mexican who sold his finds to speculators.

No. 114. Cave.—On the bluffs about 180 yards north of the river, three-fourths of a mile above Old Fort Tularosa, is a cave and shelter weathered in a stratum of yellowish tufa capped with breccia. (Pl. IX, *a*.) A row of houses formerly masked the cave, and one room of the series was excavated in the solid tufa. These houses were flimsy and a number of them were destroyed by falls of rock from the face of the overhanging cliff.

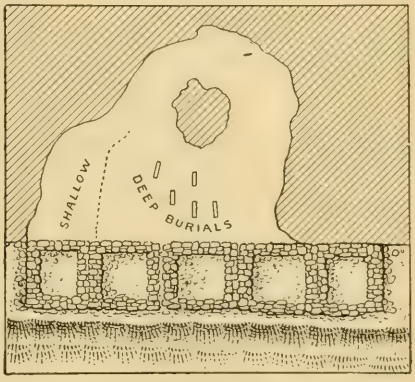


FIG. 43. Plan of cave at head of Tularosa valley.

The cave was filled with rubbish and the droppings of animals, especially of the wild turkey, to the depth of 8 feet. Mummified turkeys and whole eggs of this bird were found in the débris. Bones of other animals were numerous, and the occurrence of bison remains among them proved an interesting discovery.[a] The cave floor is irregular, containing large rocks and pockets in its surface. The section of the débris shows two beaten floor levels, the upper about 36 inches above the lower. (Pl. IX, *b*.) Under both floors burials were made, in all 5 individuals. The débris contained many sandals,

[a] M. W. Lyon, jr., Mammal Remains from two Prehistoric Village Sites in New Mexico and Arizona, *Proceedings of United States National Museum*, XXXI, 647–649, Washington, 1906.

fragments of cloth, pottery, and other artificial objects. Near the cave a room has been excavated in the rock; it has grinding places in the floor. On the slope below the cave are masses of débris from the cliff, partially covered by the house refuse.

A few years ago Mr. John Averitt, a forest ranger, did a little work in this cave and took therefrom a desiccated human body, which is now in the collection of Mr. W. J. Andrus, of Hackensack, N. J. Mr. Averitt was the first explorer of this cave.

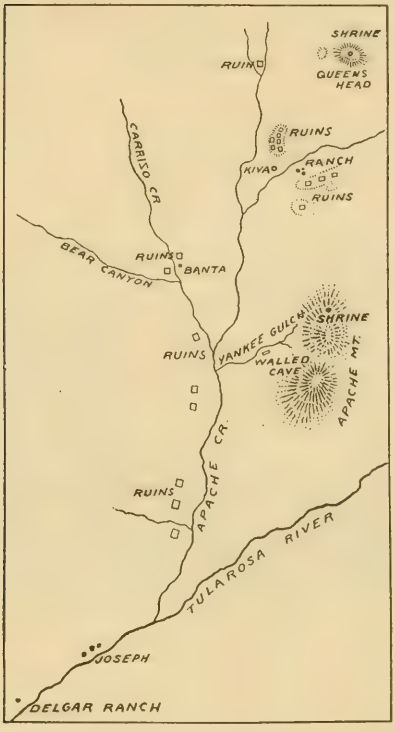


FIG. 44. Sketch map of Apache creek, showing location of ruins.

7. APACHE CREEK

No. 115. Pueblo.—On Apache creek, 1½ miles above the mouth and on the west bank of the stream, is a group of three large pueblos. The smallest ruin is remarkable in having a wall about it like the Gallo spring and the Eastcamp ruins. These were despoiled a few years ago by itinerant collectors of relics.

No. 116. Pueblos.—Two pueblos of medium size are found on the west bank of Apache creek, about 2½ miles from its mouth. They stand on a terrace nearly opposite Apache mountain, and apparently they have not been prospected.

No. 117. Walled cave.—This cave is situated on the southwest side of Yankee gulch, which heads in Apache mountain. Judging by the description, it is not of great importance, though it belongs to a type of sealed caves which are sometimes met with in the mountains of the Gila-Salt region. According to reports, the labors of those who have broken into such caves have been practically without reward.

No. 118. Pueblos.—This group of 4 rectangular stone pueblos of average size is found on Carrizo creek, a northwest branch of the Apache. One of the sites is near Mr. Banta's house, another in Bear canyon, and two at the mouth of Carrizo creek. No work has been done on these pueblos.

No. 119. Shrine.—On the southeast point of Apache mountain, 7 miles north of the S. U. ranch, which lies near the head of the Tularosa river, are stone rings in which offerings of pottery vessels were thrown (see no. 100). Prof. U. Francis Duff, of Deming, N. Mex., visited this place in 1897.[a]

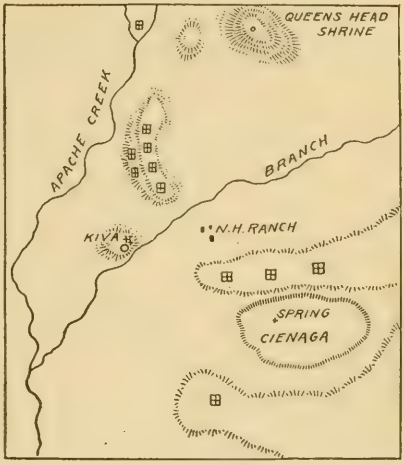


FIG. 45. Ruins at N. H. ranch, Apache creek, Socorro county, N. Mex.

No. 120. Pueblos.—In the valley of the N. H. ranch (The American Valley Company), on Apache creek 8 miles above the mouth, there is a group of 11 stone pueblos, all lying within a short distance of the ranch house. These pueblos are situated on ridges above a stream tributary to the Apache. They were rich and flourishing and their situation was ideal on account of the fertile land and abundant water in this fine valley. Many specimens of pottery and shell have been removed from the sites. The ruins consist of a north group of 6 and a south group of 4 ruins, and between these is a low mound showing traces of walls and a large circular kiva. The pottery is gray, brown, and red, occurring in the order named. West of the road, between the N. H. ranch and Eastcamp, is a small ruin. There are also ruins on the south side of Jewetts gap, along the road leading into Largo canyon, whose waters are tributary to the Little Colorado river.

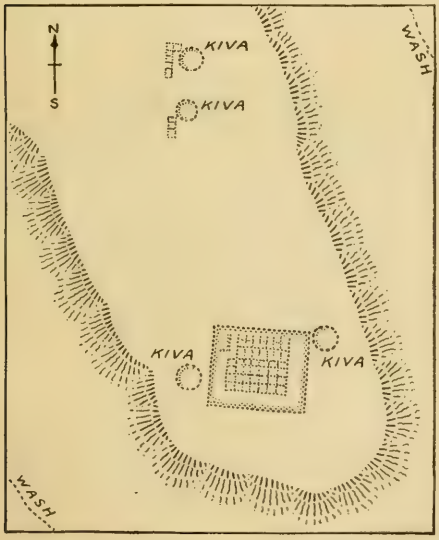


FIG. 46. Ruin at Eastcamp, Bishop ranch, western Socorro county, N. Mex.

No. 121. Pueblo.—On a ridge north of the Oliver Bishop Ranch house near Eastcamp is a ruin consisting of a large house mass of many rooms, arranged semicircularly inside of a heavy boundary wall 132 by 102 feet. There is a clear way on all sides

[a] See bibliography, p. 90.

except the north, between the house and the wall. Most of the rooms measure 6 by 8 feet, and the walls of the lower tier are of slabs of white volcanic rock, while the upper story was of dark basalt. There are two circular kivas outside the wall. From the ruins there is a good outlook over the bottom land of two "washes."

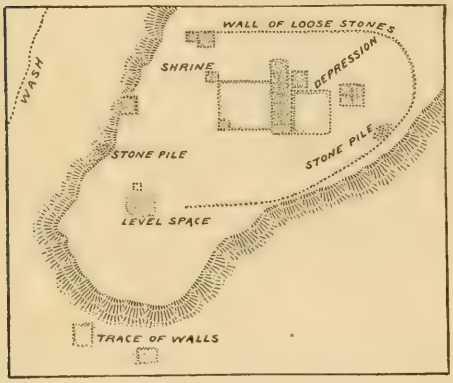


FIG. 47. Ruin west of Oliver Bishop Ranch house near Eastcamp, western Socorro county, N. Mex.

North of the ruin about 100 yards are two kivas with accompanying house structures, which are surrounded by much débris. These ruins are south of and near the divide of Largo canyon and Apache creek.

No. 122. Pueblo.—West of the ranch house of the Oliver Bishop place, near Eastcamp, is a rectangular stone pueblo. It is situated on the high hill above the cienaga and the level space of the hilltop is bounded by a stone wall. The rectangular house structure lies to the right of an artificial depression 30 feet square and 5 feet deep. There are several shrines close to the ruin, and in the talus of the hill and the level ground at the foot traces of walls are encountered. The ruin has not been systematically excavated.

No. 123. Pueblo.—This ruin is situated at Gallo spring, on the head of Apache creek near the road from Luna to Magdalena. The plan of the ruin shows a wide stone wall 400 by 150 feet surrounding a ruined house mass. The north end is occupied by an extensive plaza, having in the center a large circular depression. The cemetery lies against the wall and the burials were in sand. This ruin was systematically and thoroughly excavated by Mrs. Grosstead, whose house stands on the ruin at the present time.

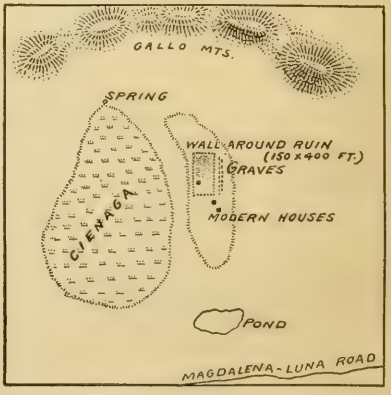


FIG. 48. Ruin at Gallo spring, western Socorro county, N. Mex.

Above the ruin is a great spring, bursting out at the head of the cienaga, which lies in a rincon of the Gallo mountains. This spring has yielded many votive offerings of pottery, a number of

which were secured by the Museum-Gates expedition of 1905. The pottery is gray, red-brown, and polished black, like that of the Tularosa and the Blue. The whereabouts of the specimens secured by Mrs. Grosstead are not known.

No. 124. Pueblo.—A number of ruins have been reported at Oak spring in the Fox mountains, said to be about 3 miles north of East-camp and about 10 miles east of Luna, N. Mex.

No. 125. Pueblos.—In the locality known as Johnsons basin, lying among the foothills east of the road from Luna to the Salt Lake, southwest of Zuñi, Mr. Ab. Johnson, a stockman, reports many large ruins. These ruins have never been examined and this is the first mention of their existence.

III.—The Upper Salt River

The general course of the Salt is nearly due west from its source in the highland about Alpine, Apache county, Ariz., where also rises the San Francisco. Its tributaries are almost exclusively from the steep watershed north of its valley. The most important of them is White Mountain creek.

1. White Mountain creek region

White Mountain creek has its origin in the "rim" southeast of the town of Pinetop, Navajo county, Ariz. On the upper reaches of the creek are caves and small stone structures which were probably hunting lodges, the country being too high and rough for permanent habitation. Lower down the stream, between Cooley's and Fort Apache, are a number of rectangular pueblo ruins, and near the post are extensive caves, which formerly were used as burial places and contained until a few years ago many desiccated human bodies.

West of White Mountain creek on Forestdale creek is a group of very large pueblos, one of which is of circular form; and on Cedar creek, a tributary of Carrizo, a large ruin due north of Silver Ball peak is reported. A number of these pueblos were explored by the Museum-Gates expedition of 1901.

To the west, on Cibicu creek, a tributary of Salt (Black) river, are other large stone pueblos like those at Forestdale; these have not been examined. Other creeks descending from the "rim" into Salt river will doubtless show, on investigation, sites of ancient habitations.

Above Fort Apache, on Salt river, are pueblos and caves which have been disturbed by curiosity seekers. So far as is known, the upper stretches of this river contain no ruins, since it runs through elevated and extremely broken country, from its head in Escudilla peak.

2. ESCARPMENT AND PLATEAU

No. 126. Pueblo.—Near Linden, 45 miles south of Holbrook, Navajo county, Ariz., is a pueblo called Pottery Hill. This pueblo lies on the divide between the Little Colorado and Salt rivers. It is quite large and appears to be very ancient. There are large quantities of banded-coil, red, and gray ware here. This site was explored by the Museum-Gates expedition of 1901.

Another pueblo with large circular kiva lies south of this ruin 1 mile. (*Report of United States National Museum*, 297, 1901.)

No. 127. Pueblos.—On Forestdale creek, 10 miles southeast of Showlow and 3 miles east of Pinetop, White Mountain Apache reservation, is a group of 4 ruins located in the lowland or hill slopes along the creek. Two of these ruins are very large; the main ruin, 7 acres in extent, is composed of a circular acropolis with rectangular additions, and was explored by the Museum-Gates expedition in 1901. (Op. cit., 287.)

No. 128. Hill Top fort.—On the summit of a high knoll above Forestdale creek and 1 mile from ruin no. 127 is a stone structure which appears to have been used as a fort. The walls were laid up of dry masonry. There are no pottery fragments or other artifacts at this place.

No. 129. Pueblo.—Near Interior sawmill, a few miles south of Cooley's, White Mountain Apache reservation, is a small ruin built of basalt blocks. It lies on the level ground above White Mountain creek, in cultivated fields. The pottery is gray and brown, and there is some coiled ware showing fine work. This ruin was explored by the Museum-Gates expedition of 1901. (Op. cit., 297.)

No. 130. Pueblos.—Along White Mountain creek, between Interior sawmill and Fort Apache, are several small rectangular stone ruins on the bench above the creek canyon. The mounds of these ruins stand high, but no walls are exposed. The pottery is gray, red, and coiled, and seems of inferior quality. Bandelier mentions these ruins.

No. 131. Pueblo.—Eight miles above Fort Apache, on the old Cooley ranch, is a pueblo which is described by Bandelier (in op. cit., 294), and was examined by the Museum-Gates expedition in 1901.

3. FORT APACHE

No. 132. Pueblo.[a]—On the west bank of the north fork of White Mountain creek, about 2 miles east of Fort Apache, is a ruin consisting of a hollow rectangle the sides of which measure about 40 by 50

[a] I am indebted to Edward S. Miller, first sergeant, U. S. Army, of Fort Apache, for much valuable information concerning the ruins in this locality, a portion of which is incorporated in nos. 132–136.

POTTERY AND STONE OBJECTS FROM RUINS NEAR FORT APACHE (COLLECTION OF SERGT. E. S. MILLER, U. S. A.)

yards. Some work has been done here in a small way. Bandelier describes the ruin as two stories high (Final Report, pt. II, 396). The ware is commonly red with black decoration and frequently has black and white ornamentation on the exterior of bowls. (Pl. x.)

No. 133. Pueblo.—On the south bank of the creek, three-fourths of a mile southeast of no. 132, is a large pueblo, measuring 50 by 80 yards. There has been sporadic excavation here. Farther up the creek are two other ruins similar to no. 133 in pottery and artifacts.

No. 134. Pueblo.—About 4 miles northeast of Fort Apache, near the foot of Sawtooth mountain, is a very large pueblo situated on both sides of a ravine in the bottom of which pines are growing. The location is about 2½ miles north of White Mountain creek. Much excavation has been carried on here, but not systematically. Bandelier estimates that the two portions or villages held a population of 800 souls. (Op. cit., 396–397.)

> The village appeared to be a compact small-house settlement. . . . The wide vale on which the ruins are situated is without water for irrigation, and I did not observe any provision made for storing, nor did I notice estufas.

No. 135. Fort.—Two miles west of Fort Apache and 150 yards from the left bank of the White Mountain creek is a construction which may have been a fort or fortified lookout. It stands on a small mesa about 100 feet high.

No. 136. Pueblo.—About 14 miles southeast of Fort Apache is a large ruin showing a ground plan of more than 80 rooms. This ruin has not been disturbed.

No. 137. Watch Tower.—Fifteen miles west of Fort Apache on a prominent butte is a structure which was reported to Bandelier (op. cit., 397). He surmises it to be a place of retreat and observation.

No. 138. Cliff-house and Partition Caves.—These are situated west of Fort Apache in the canyon of White Mountain creek. The existence of these houses also was reported to Bandelier. (Op. cit., 397.)

There are many caves on the reservation that were used for burial and ceremonial purposes. One of these not far from the Post contained numerous desiccated bodies which have been removed by collectors. The Field Museum of Natural History has many specimens from this cave. Noteworthy among objects found therein is a unique storage basket.

No. 139. Ruins.—Large ruins have been reported from Cibicu creek, a perennial stream flowing south from the "rim" and entering Salt river near the western boundary of the White Mountain Apache reservation. The valley of the Cibicu affords excellent farming land, and the majority of the Apache on the reservation live there. The ruins are about 18 miles northwest from the Post. They appear to resemble the ancient pueblos of Forestdale creek.

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4. PINAL CREEK AND MIDDLE SALT RIVER

To the west of San Carlos a high divide separates the waters of San Carlos creek from those of Pinal creek and other streams flowing into the middle Salt river near Tonto basin. There are numerous ruins in this section of Graham county east of the divide, but the only notice of them was by Bandelier, who visited this region in the early eighties. The following ruins, here numbered 140–146, were described by him:

No 140. Pueblo.—North of Globe, on a steep, rocky projection, there is a small ruin, and one fallen beam of cedar remains in the house. The pottery is corrugated and very coarse. (Bandelier, Final Report, pt. II, 415.)

No. 141. Ruin.—South of Globe, on a denuded promontory, is a large ruin of the checkerboard type. The ruin has no central mound, "but . . . the small buildings and connecting inclosures are numerous and well preserved. The walls were of stone, and none of the buildings seemed to have been higher than one story. No traces of estufas were visible." (Bandelier, op. cit., 415.)

No. 142.—At Gibson's ranch on Aliso creek, 12 miles southeast of Globe, are several small ruins, one of which has 17 compartments. It has been supplied with ditches like those of the ruin south of Fort Thomas (no. 16).

No. 143.—An important ruin stands on the north side of Salt river near the ranch and home of Mr. Armer. It is characterized by a long mound that forms part of the open polygon of the ruin. The mound is 11 feet high and contains rooms. Here were found several pieces of hammered copper and a copper rattle. (Bandelier, op. cit., 421.)

No. 144.—Five or more ruins are found near Kenton's ranch on the south side of Salt river along a stretch of 8 miles; they are like the ruins at Globe (Bandelier, op. cit., 419–420). Another ruin, said to contain 138 divisions (house inclosures), was seen by Mr. Bandelier. It is 7 miles from Globe and 4 miles above Wheatlands (Los Trigos).

No. 145.—On Pinal creek, 2 miles below Wheatlands, are two small ruins on steep promontories. One of these seems to have been surrounded by a wall. (Bandelier, op. cit., 418.)

No. 146.—About 7 miles north of Livingstone and a short distance west of Cherry creek are two small ruins of the checkerboard type, made up of mounds and quadrangles. (Bandelier, op. cit., 417.)

Many cliff-ruins and cave-dwellings are said to exist in the gorge of Salt river, near the mouth of Pinal creek, and in the Sierra Ancha, north of Salt river, many ruins are also reported. (Bandelier, op. cit., 417–418.)

IV.—The Mimbres River

Mimbres river rises in the Mimbres range within a short distance of the head of the Gila and of the sources of streams draining into the Rio Grande. It runs south by east into the basin region of northern Chihuahua, Mexico. There are numerous ruins on the upper waters of this river, some of which have been described by Bandelier (Final Report, pt. II, 350–359), who regards them as different from any other ruins examined by him in the Southwest. The principal characteristic of the village is the irregular arrangement of the houses, which are grouped around square plazas. The pottery from some sites is also different from that of any other region, and is affiliated in some respects with that of the Casas Grandes in Chihuahua, which lies in the low foothills of Sierra Madre. This is especially true in reference to the yellow ware found here, which in both form and the color of the decoration is manifestly like that of Casas Grandes. It is apparent that there are ruins on the upper river—those known at present being located at Fort Bayard—which yield more of this type of pottery, while the ruins about Deming yield generally pottery with black and white decoration. It is probable that a study of the ruins in this region will show that two cultures have overlapped in this valley.

Professor De Lashmutt informs the writer that the pottery from the Silver City region is white and black; solid red, both smooth and grooved; solid black; and coiled. The decoration is mainly geometric. From the Mimbres he has seen a realistic design resembling a grasshopper, and from Fort Bayard another representing a four-legged creature. Mrs. Owen has a specimen from Fort Bayard bearing what is described as a "fish design."

1. SILVER CITY REGION

Vernon Bailey, of the Biological Survey of the United States Department of Agriculture, informs the writer that at the head of the Mimbres and Sapillo creek (a branch of the Gila) there are numerous small ruins. These occur on almost every promontory and ridge above the river and are scattered about in the forest between the two streams. These ruins contain from 2 to 8 rooms each. The pottery is black and white, with some red and coiled specimens.

The caves lying south of the Gila, which may be reached from Silver City, N. Mex., have long been known and investigated. In 1878 Lieut. Henry Metcalf, U. S. Army, secured from them offerings, consisting of baskets, pottery, fire sticks, arrows, bows, and other objects, and forwarded them to the United States National Museum. About 1879 Mr. H. H. Rusby entered one of the ceremonial caves

and secured numerous votive objects, together with sandals, cord, and other material, which were also sent to the National Museum, where they are now preserved.

Most of the information concerning sites in the neighborhood of Silver City, N. Mex., has been kindly furnished by Prof. Ivan De Lashmutt, of the University of Arizona, at Tucson.

No. 147. Pueblo.—This ruin stands on the summit of a hill on the west bank of Whiskey creek, between the Silver City Central and Silver City Lone Mountain roads. It is about 2½ miles almost due west of Central. The ground plan shows about 30 rooms.

No. 148. Pueblo.—On the Braham ranch, now owned by the Victoria Land and Cattle Company, is a ruin of a pueblo which con-

FIG. 49. Ruin on Whiskey creek, near Central, Grant county, N. Mex.

tained 30 rooms. The walls are level with the ground, and the floors are from 2 to 8 feet below the surface. Burials are found in the houses. It is remarkable that no axes are found on this site, since in the Pinos Altos district, north of Silver City, many have been discovered. Other artifacts from this ruin are broken metates, pottery, charms, and turquoise beads. The turquoise mines in the Burro mountains, 10 to 12 miles distant, which are still worked, may have been the source of supply of this highly-prized stone which was drawn on by the ancient peoples of this region.

No. 149. Pueblos.—There are pueblos all along Whiskey creek. That on the Bateman ranch is located on a side hill. A vase containing incinerated human bones has been taken from this ruin. Far-

ther south on this stream the ruin on the Holson ranch has yielded many specimens of ancient workmanship.

No. 150. Caves.—On Lone mountain, south of Central and near the Atchison, Topeka and Santa Fé railroad, are several ruins.

Professor De Lashmutt writes:

The caves are about a mile south of the Old Lone Mountain post-office. They are in limestone, and are in the side of a cliff 150 or 250 feet above the bottom of the canyon. The rocks near the entrance are worn smooth from the Indians climbing up and down. They have evidently been utilized by the Apache, as arrowheads, several scalps inclosed in a pitched wicker water bottle, an old "six-shooter," a saddle, and horse trappings have been found there.

FIG. 50. Mealing pits in a rock outcrop on Whiskey creek, Grant county, N. Mex.

Professor De Lashmutt can not say whether any relics indicating a people earlier than the Apache have been found in these caves. There are two main caves, into one of which it is possible to penetrate about 75 feet.

No. 151. House sites.—These are found in the Whitewater mountains, northeast of a siding called Hurley (on the old maps called Hill Top), 2 or 3 miles north of a siding on the Whitewater-Santa Rita branch of the Atchison, Topeka and Santa Fé railroad. The mountains lie 12 miles east of Silver City. The rooms are made by walling up spaces between and under large masses of rock which have fallen from the cliff above, and resemble the constructions of the Yaqui Indians of Sonora, Mexico. They are probably from 800

to 1,000 feet above the bottom of the valley. In many cases the walls are still standing. On the bench underneath the bluff are the outlines of rectangular houses. The pottery resembles that found on Whiskey creek. Pictographs, in red, are found on the face of the bluff. Under a bowlder at this site a cowboy found remains of a saddletree, two carved stirrups, arrows with iron points, and other relics, possibly the spoils of an Apache raid on a Mexican or Spanish convoy en route to or from the Santa Rita copper mines.

No. 152. Pueblo.—On the O'Brien ranch, 2½ miles south of Silver City, is a ruined pueblo about as large as the one on Whiskey creek (no. 147).

No. 153. Pueblo.—This site is on the Harrington ranch, 7 or 8 miles

FIG. 51. Pictographs at Craig ranch, Silver City, Grant county, N. Mex.

northeast of Silver City, in the foothills of Pinos Altos mountains. It stands on the top of a good-sized hill and contains about 30 rooms. Between this ranch and Whiskey creek are a number of groups of ruins, and between the latter creek and the Whitewater mountains are scattered ruins.

No. 154. Pictographs and caves.—On the Craig ranch near Lone mountain, about 11 miles east of Silver City, there exist a number of pictographs. Later paintings in red ocher are also found here. In the same neighborhood there are several caves which have been used by the Indians.

No. 155. Sacred springs.—Hudson hot springs (now Faywood) lie about 4 miles east of Faywood station on the Deming-Silver City branch of the Atchison, Topeka and Santa Fé railroad. When these

springs were cleaned, large spearheads and many other things were collected. Some large bones which formed part of the deposits of the springs were also secured.

No. 156. Pueblos.—This ruin forms the site of the military hospital at Fort Bayard, Grant county, N. Mex. While the foundation for the hospital was being prepared, a portion of the ruin was uncovered, and a number of artificial objects were found. Subsequently, occupants of the Post secured pottery and other relics from the ruin, and a few specimens were donated to the United States National Museum through the courtesy of the wife of Maj. W. L. Owen, U. S. Army. The ware consists of smooth and coiled vases and bowls of white with red-brown and black decoration. One vase particularly shows by its form, color, and decoration the influence of Casas Grandes culture.

No. 157. Pueblos.—At Silver City, N. Mex., on bald hillocks near the northern boundary are two ruins well situated for defense or observation. (Bandelier, Final Report, pt. II, 364.)

2. DEMING REGION [a]

No. 158. Pueblo.—This ruin is located near Deming, Grant county, N. Mex., not far from the house of Mr. Drew Gorman. It is a small ruin and contains nothing of importance. (Duff, p. 397.)

No. 159. Pueblo.—A large ruin is situated on the foothills of the west side of Mimbres valley, opposite W. M. Taylor's store, 2 miles above Gorman's. It is built of flat rock laid up with mortar. Much fine pottery has been exhumed here. (Duff, p. 398.)

No 160. Pueblo.—Near Allison ranch, above W. M. Taylor's store.

I have in my possession 20 feet of fine, large beads which were found in a bowl taken from a grave beneath the floor of one of the rooms of this ruin; among them are 70 turquoise beads. In the same bowl were many small polished shells and 2 small figures, carved from shell or bone, representing toads. It also contains some 30 or 40 bracelets made from some kind of shell. These, however, were all broken when they came into my possession. I have been told that village or pueblo sites are found along the whole length of the upper course of the Mimbres river. (Duff, p. 396.)

No. 161. Pueblo.—Near Wilson's windmills, 6 miles north of Deming, is a ruin which has been almost obliterated, but many arrowheads have been found on the site. (Duff, p. 397.)

Nos. 162–164. Pueblos.—Numerous pueblo sites, some of them quite extensive, are located around the base of Black butte, 10 miles north of Deming. Mr. Duff mentions also various ruins on the Mimbres, between Black butte and Oldtown; also near the Southern Pacific

[a] The ruins of the Deming region were brought to notice by the late U. Francis Duff, who was an earnest student of southwestern archeology. His paper, The Ruins of the Mimbres Valley, *American Antiquarian*, XXIV, 397, 1902, has been utilized in preparing the above list of ancient remains of this region, and is the work of the author which is referred to throughout this section.

tracks, opposite the west end of Black butte, is a small group of remains. (Page 397.)

No. 165. Pueblos.—One-half mile south of Oldtown and 22 miles from Deming are extensive ruins. One of these is a pueblo built on a sheer bluff 80 feet high. The ruin shows the outlines of 60 rooms, and part of the buildings evidently stood more than one story high. Professor Duff says (p. 398):

> From beneath the floor of one of the rooms in the ruins at Oldtown Mr. David Baker and myself took out four fine ollas (bowls) inverted over crania, these bowls having a hole knocked in the bottom, each inverted over the skull of a skeleton. They were found 4 feet beneath the surface, and were as fresh and nice in parts as when placed there. The dead had been laid away with their heads to the east and in the eastern portion of the room.

This section of the Mimbres valley affords excellent land for agriculture, and the pueblo remains are correspondingly large. Bandelier includes them in his account of Mimbres Valley ruins.

No. 166. Pueblo.—On the east side of the Mimbres, 1 mile from Oldtown, is a pueblo which was built of flat rock laid up in mortar. (Duff, p. 397.)

No. 167. Pueblos.—On the Mimbres river, below Deming, are several pueblos which are mentioned by Mr. Duff, one of them situated on the ranch of Mr. Byron and the other near the Keith ranch. Two miles northwest from Byron's an old burying ground exists, but of the village, which was built of adobes, little remains. Professor Duff states (p. 399):

> Mr. Ralph Byron and myself exhumed a skeleton from a level patch of ground north of the main ruin at their ranch. The skull has a small decorated bowl inverted over it, but badly broken. The skeleton laid about 1½ feet beneath the surface and had been buried with the head toward the east.

In the crown of the hill near Mr. Byron's are mortars cut in the rock, and pestles 1 to 2 feet long are found in this vicinity. The mortars are from 5 to 12 inches in diameter and 12 to 18 inches deep.

No. 168. Pueblo.—The existence of an ancient pueblo ruin on the ranch of Henry Coleman, 6 miles from Deming, near the upper end of the Florida mountains, is mentioned by Mr. Duff (p. 397).

No. 169. Pueblos.—A number of ruins lie at the base of Red mountain, 8 miles southwest of Deming. One of them, situated a short distance from Thomas Word's ranch, is large, and great quantities of broken pottery occur there. (Duff, p. 398.)

No. 170. Pueblo.—Thirty miles southwest of Deming, near Col. Richard Hudson's Cedar Grove ranch, evidences of occupancy are reported as very marked, but no excavations were made. (Duff, p. 398.)

No. 171. Pueblo.—This ruin is on the ranch of Mrs. Collins, 4 miles west of Deming. (Duff, p. 397.)

No. 172. Pueblos.—Near the ranch of Herman Greenwald, 2 miles south of Brockmann's mills, upper Mimbres, there are 5 groups of ruins on the slope of the promontory above the river.

No. 173. Pueblo.—There is also a pueblo at Brockmann's mills (R. 10 E., 19 S.), located on the bottom land. (Bandelier, Final Report, pt. II, 358.)

No. 174. Pueblos.—Bandelier estimates that between Hicks's ranch and Brockmann's mills there are on a stretch of 30 miles along the Mimbres about 60 ruins.

I have not seen a village whose population I should estimate at over 100, and the majority contained less. They were built of rubble in mud or adobe mortar, the walls usually thin, with doorways, and a fireplace in one corner formed by a recess bulging out of the wall. Toward the lower end of the permanent watercourse the ruins are said to be somewhat more extensive. It is very evident from the amount of material still extant, from what has been used in building modern constructions, and from the size of the foundations, that whatever houses existed were not over one story high. (Bandelier, op. cit., 357.)

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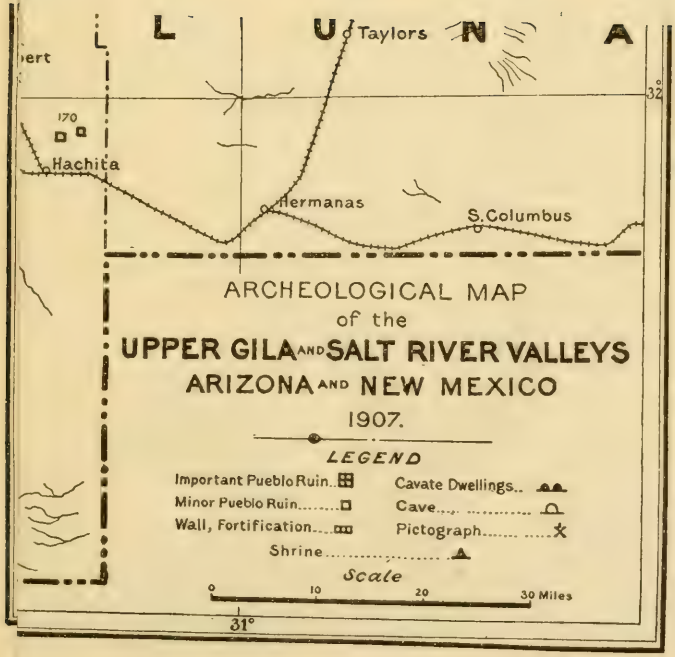
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ARIZONA AND NEW MEXICO
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Important Pueblo Ruin
Minor Pueblo Ruin
Wall, Fortification
Shrine
Cavate Dwellings
Cave
Pictograph
Scale
0 10 20 30 Miles
31°

NAVAJO
APACHE
WHITE MOUNTAIN
GILA
INDIAN RESERVATION
SOCORRO
GRAHAM
PINAL
SIERRA
LUNA
PIMA
COCHISE
SANTA CRUZ
Linden
Showlow
Pinetop
Springerville
Eagar
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Central
Safford
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(Pueblo Viejo)
San Jose
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Ft Huachuca
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San Simon Cr.
Whitewater R.
Mimbres R.
Rio Grande Plains
Agustin Plains
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Scale
0 10 20 30 Miles
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